

Superfund Records Center

SITE: SUTTON Brook

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0908-1604

6/1/88
11/1/88
7/1/88
Riteflex BP

Thermoplastic Polyester Elastomer

MATERIAL SAFETY DATA SHEET

EMERGENCY TELEPHONE NO.: 512-584-2737		INFORMATION TELEPHONE NO. 800-526-4960		REVISION DATE: 3/87	
I. IDENTIFICATION		PRODUCT NAME Riteflex BP BPX-8929			
CHEMICAL FAMILY Thermoplastic Polyester Elastomer		CHEMICAL ABSTRACT REGISTRY NO.: Base Resin 82662-36-0			
DEPARTMENT OF HAZARD CLASSIFICATION TRANSPORTATION Non-Hazardous		SHIPPING NAME Plastic Material			
II. PHYSICAL DATA		MELTING POINT 330°F - 442°F (166°C - 228°C) depending on grade			
SPECIFIC GRAVITY (H ₂ O = 1) 1.15-1.24		VAPOR PRESSURE AT 20°C mm Hg <0.001		STATE	SOLID X
PERCENT VOLATILES BY WEIGHT <0.5%		SOLUBILITY IN WATER % BY WT. <0.001			LIQUID
APPEARANCE AND ODOR Essentially odorless pellets.					GAS
III. HAZARDOUS INGREDIENTS					
This is a polymeric material. All constituents are encapsulated within the polymer system, and therefore, present no likelihood of exposure under normal conditions of processing and handling.					
IV. FIRE AND EXPLOSION HAZARD DATA					
FLAMMABLE LIMITS IN AIR % BY VOLUME		LOWER No information available	UPPER	FLASH POINT not determined	
EXTINGUISHING MEDIA CO ₂ , foam, dry chemical, or water spray. Treat as Class B fire.					
SPECIAL FIRE FIGHTING PROCEDURES Water should be used to keep fire-exposed container cool. Water and/or dry chemical should not be used on machinery. Self-contained breathing apparatus and personal protective equipment may be needed for large fires.					
UNUSUAL FIRE AND EXPLOSION HAZARDS None					

Values shown are based on testing of laboratory test specimens and represent data that fall within the normal range of properties for natural material. Colorants or other additives may cause significant variations in data values. These values are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Any determination of the suitability of the material for any use contemplated by the user and the manner of such use is the sole responsibility of the user, who must assure himself that the material as subsequently processed meets the needs of his particular product or use.

To the best of our knowledge the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy or completeness of such information. Moreover, there is a need to reduce human exposure to many materials to the lowest practical limits in view of possible long-term adverse effects. To the extent that any hazards may have been mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones which exist. We recommend that anyone intending to rely on any recommendation or to use any equipment, process or technique, or material mentioned in this publication should satisfy himself that he can meet all applicable safety and health standards. We strongly recommend that users seek and adhere to the manufacturer's or supplier's current instructions for handling each material they use. Infringement of any patents is the sole responsibility of the user.

Celanese Engineering Resins, Inc.

a subsidiary of HOECHST CELANESE CORPORATION

26 Main Street, Chatham, N.J. 07928 201-635-2600

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TRW-00240

CELANESE
ENGINEERING RESINS, INC.

0908-1605

V. REACTIVITY DATA		STABILITY	UNSTABLE	STABLE X
CONDITIONS TO AVOID		Do not heat above 520°F (271°C). Avoid prolonged exposure to temperatures above 500°F (260°C).		
INCOMPATABILITY (MATERIALS TO AVOID) Strong bases.				
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS Major: CO Minor: aldehydes, ketones, esters, acids, alcohols, butadiene, tetrahydrofuran, toluene, benzoic acid, terephthalic acid.				
HAZARDOUS POLYMERIZATION	MAY OCCUR	WILL NOT OCCUR X	CONDITIONS TO AVOID	
VI. HEALTH HAZARD DATA				
ACUTE EFFECTS OF EXPOSURE				
INGESTION (SWALLOWING)	No specific information available, however, low toxicity by this route is expected based on biological activity of high molecular weight polyester polymers.			
INHALATION (BREATHING)	No specific information available. Pellets are not considered an inhalation hazard; polymer particulates may be considered an inert or nuisance particulate.			
SKIN (CONTACT AND ABSORPTION)	No specific information available, however, not expected to present dermal toxicity hazard. Molten material has the potential to cause thermal burns.			
EYE (CONTACT)	No specific information available. Polymer particle may act as foreign body.			
CHRONIC EFFECTS OF EXPOSURE	No specific information available.			
EMERGENCY AND FIRST AID PROCEDURES				
EYE (CONTACT)	Flush with plenty of water. Seek medical attention if discomfort persists, and to remove foreign body.			
SKIN (CONTACT)	If molten polymer contacts skin, cool rapidly with cold water. Seek medical attention.			
INGESTION (SWALLOWING)	If significant quantity has been swallowed, give two glasses of water and induce vomiting. Seek medical attention.			
INHALATION (BREATHING)	Remove to fresh air. Seek medical attention if symptoms persist.			
VII. SPILL OR LEAK PROCEDURES				
STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED		Pellets are slippery. Sweep up and place in disposal container.		
WASTE DISPOSAL METHOD Incinerate or bury in landfill in accordance with federal, state and local regulations. This product as shipped is not a RCRA hazardous waste under present EPA regulations.				
VIII. SPECIAL PROTECTION INFORMATION		RESPIRATORY PROTECTION (SPECIFIC TYPE)		
A properly fitted NIOSH approved respirator for dust is recommended if there is a possibility of dust/fiber generation.				
VENTILATION	LOCAL EXHAUST	Recommended when appropriate to control employee exposure.		
	MECHANICAL (GENERAL)	May not be adequate as the sole means to control employee exposure.		
PROTECTIVE GLOVES Recommended during melt processing.		EYE PROTECTION Safety eyewear recommended.		
IX. SPECIAL PRECAUTIONS				
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Store in cool dry place.				
OTHER PRECAUTIONS OSHA PEL for nuisance or inert dust is 15 mg/M ³ (total) and 5 mg/M ³ (respirable). ACGIH TLV for nuisance particulates is 10 mg/M ³ (total) and 5 mg/M ³ (respirable).				

TRW-00241

 **ELANESE**
ENGINEERING RESINS

Dear Purchasing Agent:

Calanese is committed to providing customers with as much information as possible about the products it sells them. We have long recognized the importance of Material Safety Data Sheets (MSDS's) as the principal information resource in a good hazards communication program. Enclosed you will find MSDS's for the products that you have purchased from Calanese Engineering Resins. We will continue to send new and revised MSDS's on a periodic basis. Any significant new information will be sent to you as soon as it is known. Should you need additional copies of the MSDS's for internal distribution, please contact Resins Technical Service at the address below or by calling (201) 635-4396.


However, the development of quality MSDS's is only half the program. To have an effective hazards communication program, the information contained in the MSDS must be communicated to the person who is actually handling the material. The responsibility for hazards communication varies widely between corporations with different management styles. We need your help in seeing that the MSDS's are given to the individual who has that responsibility within your company. In addition, we would greatly appreciate the title and address of this individual. We feel this would facilitate future distribution of new or revised MSDS's. It is equally important that you ensure that your agents, contractors, distributors, and customers who may come in contact with any Calanese products are made aware of the information.

Please discard any earlier dated MSDS(s) for this (these) product(s).

We appreciate your continued business and assure you that Calanese is committed to supplying the kinds of information needed to permit you to handle our products with minimal risk to your employees and customers.

Sincerely,

CELANESE ENGINEERING RESINS, INC.


G. S. Krimherbaum
Manager - Standards, Codes &
Technical Support

GSK/et

Enclosure(s)

TO THE BEST OF OUR KNOWLEDGE THE INFORMATION CONTAINED IN THIS PUBLICATION IS ACCURATE; HOWEVER, WE DO NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OR COMPLETENESS OF SUCH INFORMATION. MOREOVER, THERE IS A NEED TO REDUCE HUMAN EXPOSURE TO MANY MATERIALS TO THE LOWEST PRACTICAL LIMITS IN VIEW OF POSSIBLE LONG-TERM ADVERSE EFFECTS. TO THE EXTENT THAT ANY HAZARDS MAY HAVE BEEN MENTIONED IN THIS PUBLICATION, WE NEITHER SUGGEST NOR GUARANTEE THAT SUCH HAZARDS ARE THE ONLY ONES WHICH EXIST. FINAL DETERMINATION OF THE SUITABILITY OF ANY INFORMATION OR PRODUCT FOR THE USE CONTEMPLATED BY ANY USER, THE MANNER OF THAT USE AND WHETHER THERE IS ANY INFRINGEMENT OF PATENTS IS THE SOLE RESPONSIBILITY OF THE USER. WE RECOMMEND THAT ANYONE INTENDING TO RELY ON ANY RECOMMENDATION OR TO USE ANY EQUIPMENT, PROCESSING TECHNIQUE OR MATERIAL MENTIONED IN THIS PUBLICATION SHOULD SATISFY HIMSELF AS TO SUCH SUITABILITY AND THAT HE CAN MEET ALL APPLICABLE SAFETY AND HEALTH STANDARDS. WE STRONGLY RECOMMEND THAT USERS SEEK AND ADHERE TO THE MANUFACTURER'S OR SUPPLIER'S CURRENT INSTRUCTIONS FOR HANDLING EACH MATERIAL THEY USE.

MATERIAL SAFETY DATA SHEET

SECTION I NAME AND PRODUCT

MANUFACTURER'S NAME: General Electric Co. ADDRESS (STREET, CITY, STATE AND ZIP CODE): Specialty Materials Department 6325 Huntley Road Worthington, Ohio 43085 U.S.A.	CONTACT: P. D. St. Pierre EMERGENCY TELEPHONE NO (614) 438-2305 APPROVED BY <i>[Signature]</i> DATE 11-12-85
TRADE NAME, COMMON NAME OR SPECIFICATION: BZN A tool blanks and inserts, sintered polycrystalline cubic boron nitride on a cemented tungsten carbide substrate with cobalt binder	
CHEMICAL FAMILY OR PRODUCT TYPE: Abrasive tool blank	

SECTION II COMPOSITION

CHEMICAL NAME	COMMON NAME	REG ^y (Y/N)	CAS #	OSHA PERMISSIVE EXPOSURE LIMIT	ACGIH TLV	CARCIN- OGEN ^m (Y/N)
Cubic boron nitride (BN)		N	---	---	---	N
Tungsten carbide (limits for tungsten dust)		N	---	---	5 mg/cu M	N
Cobalt (Co)		Y	---	0.1 mg/cu M	1.1 mg/cu M	N

Materials are regulated by OSHA 29 CFR 1910.1200 Hazard Communication Standard.

SECTION III PHYSICAL AND CHEMICAL DATA

BOILING POINT: N/A	MELTING POINT: N/A	SPECIFIC GRAVITY: N/A
VAPOR PRESSURE: N/A	PERCENT VOLATILE BY VOL.: Not Volatile	VAPOR DENSITY: N/A
EVAPORATION RATE: N/A	SOLUBILITY IN WATER: Insoluble	SOLUBILITY IN ALCOHOL: Insoluble
SOLUBILITY IN OTHER SOLVENT: Tungsten carbide		
APPEARANCE AND ODOR: soluble in strong acid		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: NAIF	(METHOD USED) N/A	FLAMMABLE LIMITS: LEL: N/A UEL: N/A
EXTINGUISHING MEDIA: NAIF		
SPECIAL FIRE FIGHTING PROCEDURES: None		
EXPLOSION POTENTIAL: None		

SECTION V HEALTH, FIRST AID AND MEDICAL DATA

PRIMARY ROUTE(S) OF ENTRY	ACUTE AND CHRONIC HEALTH EFFECTS AND EFFECTS OF OVEREXPOSURE	FIRST AID AND MEDICAL INFORMATION
INHALATION:	Dust from grinding can cause nose and throat irritation. Potential for causing transient or permanent respiratory disease (probably from cobalt dust).	Remove from exposure; seek medical attention.
INGESTION:	No information available for ingestion that may have occurred in the tungsten carbide industry. It has been suggested that cobalt has the potential for causing blood, heart and organ problems.	If substantial quantities are ingested, dilute with a large amount of water, induce vomiting; seek medical attention.
SKIN CONTACT & ABSORPTION	Can cause irritation or allergic skin rash due to cobalt sensitization.	Wash with soap and water; seek medical attention.
EYE:	Can cause irritation.	Flush eyes with water; seek medical attention.
OTHER POTENTIAL	NAIF	
HEALTH RISKS:		

* Trademark of General Electric Co., U.S.A.

SECTION VI CORROSIVITY AND REACTIVITY DATA

STABILITY: UNSTABLE () STABLE (X) POLYMERIZATION: MAY OCCUR () WILL NOT OCCUR (X)
INCOMPATIBILITY (MATERIALS TO AVOID):

DECOMPOSITION PRODUCTS: NAIF

CONDITIONS TO BE AVOIDED:

SECTION VII STORAGE, HANDLING AND USE PROCEDURES

NORMAL STORAGE AND HANDLING: Handle with adequate ventilation for nuisance dust. See OSHA 29CFR 1910.94 (Ventilation) and 29CFR 1910.1000 (Air Contaminants).

NORMAL USE: Handle with adequate ventilation for nuisance dust. See OSHA 29CFR 1910.94 (Ventilation) and 29CFR 1910.1000 (Air Contaminants).

STEPS TO BE TAKEN IN CASE OF LEAKS OR SPILLS: Sweep up and dispose inert solid.

WASTE DISPOSAL METHOD: Normal cleanup procedures.

SECTION VIII PERSONAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE):

VENTILATION	LOCAL: Yes
	MECHANICAL: Yes
Yes	(GENERAL)
	OTHER: None

PROTECTIVE GLOVES: Protective gloves are recommended when contact with dust or mist is likely.

EYE PROTECTION: When operating grinding, cutting or drilling equipment.

OTHER EQUIPMENT:

MEASURES TO BE TAKEN DURING REPAIR AND MAINTENANCE OF CONTAMINATED EQUIPMENT THAT HAS BEEN IN CONTACT WITH THIS MATERIAL: NAIF

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: None

OTHER PRECAUTIONS: Adequate exhaust

NOTE:

As supplied by General Electric we know of no hazards related to our product beyond those that might be expected in grinding any material. The product contains cubic boron nitride, tungsten carbide and cobalt in aggregate or solid form. Grinding sintered tungsten carbide/cobalt tooling has been well established in the metal working industry for more than 50 years. The precautions used comprise of safety shields, safety eye glasses, and good ventilation with well-placed air intakes near the source of the grinding dust. The cobalt content of the diamond table is less than 10% by weight. The tungsten carbide is standard commercial grade and contains about 13% cobalt by weight. The cobalt involved here is solid and should present no additional hazards as long as local exhaust ventilation is provided.

AA NAIF = NO APPLICABLE INFORMATION FOUND

AAA N/A = NOT APPLICABLE

TRW-00244

0908-1609

Material Safety Data Sheet

Manufacturer's Name: Plating Systems & Technologies, Inc.
317 North Mechanic Street
Jackson, Michigan 49201

Telephone: 517-783-4776 (24 Hour)

Section 1 - Identification

Trade Name: Barrel Immersion Coppering Powder No. 303
Product Code: 303
Chemical Name and Synonyms: Mixture
Chemical Family: Mixture
Formula: Proprietary

Section 2 - Hazardous Ingredients

<u>Identity</u>	<u>CAS Number</u>	<u>Percent</u>	<u>TLV</u>
Copper Sulfate (Basic)	1331-14-5	<40	1.0 mg/m ³ (as Copper)

This product contains no components which are listed by IARC or OSHA as carcinogens and is not listed in NTP.

Section 3 - Supplier Notification under Section 313

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

<u>CAS Number</u>	<u>Chemical Name</u>	<u>Percent By Weight</u>
7440-50-8	Copper (present as basic sulfate)	15

Section 4 - Physical Data

Boiling Point: not applicable Specific Gravity: 64#/ft³
Vapor Pressure (mm Hg): n/a Percent Volatile: 0
Vapor Density (Air = 1): n/a Evaporation Rate: n/a
Solubility In Water: approximately 70%
Appearance and Odor: medium green powdered product with no distinguishable or characteristic odor

Section 5 - Fire and Explosion Hazard Data

Flash Point: not flammable Flammable Limits: Lel: n/a Uel: n/a
Extinguishing Media: not applicable
Special Fire Fighting Procedures: not applicable

Unusual Fire and Explosion Hazards: none

Section 6 - Health Hazard Data

Threshold Limit Value: (of Basic Copper Sulfate, As Copper):
2.0 mg/m³

Primary Routes of Exposure: Through skin, through breathing
dusts, or through eyes.

Effects of Overexposure: For skin: mild dermatitis; From
inhalation: irritation; From ingestion: As with all copper
compounds, this material is toxic.

Emergency First Aid Procedures: Eye/skin contact: flush or wash
with water as required. For ingestion: induce vomiting; obtain
immediate medical attention.

Section 7 - Reactivity Data

Stability: (Stable or Unstable): Stable
Conditions to Avoid: Not Applicable
Incompatibility (Materials to Avoid): Not Applicable
Hazardous Decomposition Products: Not applicable
Hazardous Polymerization: Will not occur
Conditions to Avoid: Not applicable

Section 8 - Spill or Leak Procedures

Steps to be Taken in Case Material is Released or Spilled:
Sweep up and discard.

Waste Disposal Method: Dispose of in accordance with all
applicable federal, state, and local regulations (This product
contains copper as Basic Copper Sulfate).

Section 9 - Special Protection Information

Respiratory Protection: Approved Dust Respirator
Ventilation: Local Exhaust: Recommended Special: n/a
Mechanical (General): Recommended Other: n/a
Protective Gloves: Rubber or plastic gloves are recommended
Eye Protection: Safety glasses or chemical safety goggles
Other Protective Equipment: Not required

Section 10 - Special Precautions

Precautions to be Taken In Handling and Storing:
Keep container closed when not in use.
Other Precautions: None required.

Section 11 - Transportation Data

D.O.T. : Not hazardous
Reportable Quantity: 50 Pounds
Freight Classification: RQ, Copper Sulfate Mixture

Section 12 - NFPA Hazard Ratings

Reactivity: 0 Fire/Flammability: 0 Health/Toxicity: 3
4: Extreme; 3: High; 2: Moderate; 1: Slight; 0: Insignificant

Prepared by: Thomas H. Rochester
Original Date: January 19, 1989
Reviewed and Revised: January 30, 1990

NFPA Code
 Health 2
 Flammability 3
 Reactivity 0

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 4292-3X2J
 DATE OF PREP. February 9, 1990

Section I

MANUFACTURER: RAFFI & SWANSON, INC.
 100 EAMES STREET
 WILMINGTON, MA 01887

MANUFACTURERS' CODE IDENTIFICATION:

Black Bake Enamel 4292-3X2J

EMERGENCY TELEPHONE NO.: 617-933-4200

PRODUCT CLASS: Solvent Based Coating

TRADE NAME:

THIS PRODUCT IS A MIXTURE CONTAINING ONE OR MORE HAZARDOUS INGREDIENTS.

INFORMATION ON THE COMPOSITION OF RAFFI & SWANSON, INC. PRODUCTS IS CONFIDENTIAL PROPRIETARY INFORMATION AND IS PROVIDED SOLELY TO AID IN SAFE HANDLING OF THESE MATERIALS. USE OR DISCLOSURE FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

Section II — HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	APPROX. PERCENT BY WEIGHT	TLV		LEL % BY VOL	VAPOR PRESSURE mm of Hg
			PPM	mg/M ³		
Xylol †	1330-20-7	42	100		1.0	5.9
n-Butyl Alcohol-skin †	71-36-3	6	50		1.4	4.3
Ethyl Benzene †	100-41-4	5	100		1.0	10
Formaldehyde *C*†	50-00-0	0.54	1		--Not Applicable--	
Talc (dispersed in liquid)	14807-96-6	--	-----Not Applicable-----			
Carbon Black (dispersed in liquid)	1333-86-4	--	-----Not Applicable-----			

† Subject to the reporting requirements of EPA Reg. 40 CFR 372 (SARA Title III, Sec. 313).

C indicates a carcinogen or suspect carcinogen according to ACGIH, OSHA, NTP or IARC.

Section III — PHYSICAL DATA

EVAPORATION RATE: ☐ FASTER ☒ SLOWER, THAN ETHER

VAPOR DENSITY: ☒ HEAVIER ☐ LIGHTER, THAN AIR

BOILING RANGE: 243°-291°F PERCENT VOLATILE BY VOL: 63%

WEIGHT PER GAL: 8.57#

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION:

FLASH POINT (closed cup): 81°F lowest

LEL: 1.0%

DOT: Flammable Liquid

flashing component

OSHA: Flammable Liquid-Class IB

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, sparks and open flame. Do not apply to hot surfaces.

Containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Water may be used to cool closed containers. Irritating or toxic gases may be present. Use self-contained breathing apparatus.

TRW-00248

Section V — HEALTH HAZARD DATA (Based on data for individual ingredients)**THRESHOLD LIMIT VALUE** - See Section II**EFFECTS OF OVEREXPOSURE****CHRONIC TOXICITY:** See Section IX.**INHALATION:** Vapor irritating to eyes, nose, and throat. Can cause headache, dizziness, nausea, weakness, loss of consciousness. Prolonged overexposure may cause permanent injury.**SKIN:** Penetrates skin.

Prolonged and repeated contact may cause drying of the skin, and absorption of harmful amounts.

EYE CONTACT: Burning and irritation.**INGESTION:** Do not take internally. May cause nausea, vomiting, diarrhea and other toxic effects.**EMERGENCY AND FIRST AID PROCEDURES****INHALATION:** Provide fresh air. Give artificial respiration or oxygen if necessary. CALL A PHYSICIAN.**SKIN:** Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Wash clothes thoroughly before re-use.**EYE CONTACT:** Flush with water for at least 15 minutes. SEE PHYSICIAN.**INGESTION:** DO NOT INDUCE VOMITING.

If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. CALL A PHYSICIAN.

Section VI — REACTIVITY DATA**STABILITY:** ☐ UNSTABLE ☒ STABLE**HAZARDOUS POLYMERIZATION:** ☐ MAY OCCUR ☒ WILL NOT OCCUR**HAZARDOUS DECOMPOSITION PRODUCTS:** Combustion produces carbon monoxide and carbon dioxide. Unidentified organic compounds may be formed.**MATERIALS AND CONDITIONS TO AVOID:** Strong acids, strong alkalis, strong oxidizers.**Section VII — SPILL OR LEAK PROCEDURES****STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:** Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.**WASTE DISPOSAL METHOD:** Incinerate in approved facility. Do not incinerate closed containers. Dispose in accordance with local, state and federal regulations.**Section VIII — SPECIAL PROTECTION INFORMATION****RESPIRATORY PROTECTION:** Avoid breathing concentrated vapors or overspray particles if sprayed. In confined or poorly ventilated areas, use NIOSH approved mask with chemical canister or supplied air.**VENTILATION:** Provide general mechanical ventilation or local exhaust ventilation sufficient to keep concentration of solvent vapors below 50 PPM**PROTECTIVE GLOVES:** Use chemical resistant, impervious gloves for **contact**..**EYE PROTECTION:** Safety goggles or face shield where splashes can occur.**OTHER PROTECTIVE EQUIPMENT:****Section IX — SPECIAL PRECAUTIONS****PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:** ☒ FLAMMABLE ☐ COMBUSTIBLE

Keep in closed containers. Avoid sparks or flame when handling. Can be stored under ambient conditions. Keep closures tight and containers upright to prevent leakage.

OTHER PRECAUTIONS: Avoid contact with the skin. Use good personal hygiene practices. Wash hands thoroughly before eating/drinking/smoking/using toilet facilities.

Inhalation of formaldehyde has been shown to cause cancer in laboratory animals.

Health 2
Flammability 3
Reactivity 0

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 4292-2J
DATE OF PREP. March 30, 1990

Section I

MANUFACTURER: RAFFI & SWANSON, INC.
100 EAMES STREET
WILMINGTON, MA 01887

MANUFACTURERS' CODE IDENTIFICATION:

Glossy Black Bake Enamel 4292-2J

EMERGENCY TELEPHONE NO.: 617-933-4200

PRODUCT CLASS: Solvent Based Compound

TRADE NAME: None

THIS PRODUCT IS A MIXTURE CONTAINING ONE OR MORE HAZARDOUS INGREDIENTS.

INFORMATION ON THE COMPOSITION OF RAFFI & SWANSON, INC. PRODUCTS IS CONFIDENTIAL PROPRIETARY INFORMATION AND IS PROVIDED SOLELY TO AID IN SAFE HANDLING OF THESE MATERIALS. USE OR DISCLOSURE FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

Section II — HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	APPROX. PERCENT BY WEIGHT	TLV		LEL % BY VOL	VAPOR PRESSURE mm of Hg
			PPM	mg/M ³		
Xylol †	1330-20-7	48	100		1.0	5.9
n-Butyl Alcohol-skin †	71-36-3	7	50		1.4	4.3
Ethyl Benzene †	100-41-4	5	100		1.0	10
Formaldehyde *C* †	50-00-0	0.57	1		--Not Applicable--	
Carbon Black (dispersed in liquid)	1333-86-4	--	-----Not Applicable-----			

† Subject to the reporting requirements of EPA Reg. 40 CFR 372 (SARA Title III, Sec. 313).

C indicates a carcinogen or suspect carcinogen according to ACGIH, OSHA, NTP or IARC.

† Subject to the reporting requirements of EPA Reg. 40 CFR 372 (SARA Title III, Sec. 313).

C indicates a carcinogen or suspect carcinogen according to ACGIH, OSHA, NTP or IARC.

Section III — PHYSICAL DATA

EVAPORATION RATE: ☐ FASTER ☒ SLOWER, THAN ETHER

VAPOR DENSITY: ☒ HEAVIER ☐ LIGHTER, THAN AIR

BOILING RANGE: 243°-291°F PERCENT VOLATILE BY VOL: 68%

WEIGHT PER GAL: 8.13#

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION:

FLASH POINT (closed cup): 59°F lowest
flashing component

LEL: 1.0%

DOT: Flammable Liquid

OSHA: Flammable Liquid-Class IB

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, sparks and open flame. Do not apply to hot surfaces.
sed containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Water may be used to cool closed containers. Irritating or toxic gases may be present.
Use self-contained breathing apparatus.

TRW-00250

Section V — HEALTH HAZARD DATA (Based on data for individual ingredients)THRESHOLD LIMIT VALUE - See Section IIEFFECTS OF OVEREXPOSURECHRONIC TOXICITY: See Section IX.INHALATION: Vapor irritating to eyes, nose, and throat. Can cause headache, dizziness, nausea, weakness, loss of consciousness. Prolonged overexposure may cause permanent injury.SKIN: Penetrates skin.

Prolonged and repeated contact may cause drying of the skin, and absorption of harmful amounts.

EYE CONTACT: Burning and irritation.INGESTION: Do not take internally. May cause nausea, vomiting, diarrhea and other toxic effects.EMERGENCY AND FIRST AID PROCEDURESINHALATION: Provide fresh air. Give artificial respiration or oxygen if necessary. CALL A PHYSICIAN.SKIN: Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Wash clothes thoroughly before re-use.EYE CONTACT: Flush with water for at least 15 minutes. SEE PHYSICIAN.INGESTION: DO NOT INDUCE VOMITING.

If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. CALL A PHYSICIAN.

Section VI — REACTIVITY DATASTABILITY: ☐ UNSTABLE ☒ STABLEHAZARDOUS POLYMERIZATION: ☐ MAY OCCUR ☒ WILL NOT OCCURHAZARDOUS DECOMPOSITION PRODUCTS: Combustion produces carbon monoxide and carbon dioxide. Unidentified organic compounds may be formed.MATERIALS AND CONDITIONS TO AVOID: Strong acids, strong alkalis, strong oxidizers.**Section VII — SPILL OR LEAK PROCEDURES**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.WASTE DISPOSAL METHOD: Incinerate in approved facility. Do not incinerate closed containers. Dispose in accordance with local, state and federal regulations.**Section VIII — SPECIAL PROTECTION INFORMATION**RESPIRATORY PROTECTION: Avoid breathing concentrated vapors or overspray particles if sprayed. In confined or poorly ventilated areas, use NIOSH approved mask with chemical canister or supplied air.VENTILATION: Provide general mechanical ventilation or local exhaust ventilation sufficient to keep concentration of solvent vapors below 50 PPMPROTECTIVE GLOVES: Use chemical resistant, impervious gloves for contact.EYE PROTECTION: Safety goggles or face shield where splashes can occur.OTHER PROTECTIVE EQUIPMENT:**Section IX — SPECIAL PRECAUTIONS**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: ☒ FLAMMABLE ☐ COMBUSTIBLE

Keep in closed containers. Avoid sparks or flame when handling. Can be stored under ambient conditions. Keep closures tight and containers upright to prevent leakage.

OTHER PRECAUTIONS: Avoid contact with the skin. Use good personal hygiene practices. Wash hands thoroughly before eating/drinking/smoking/using toilet facilities.

Inhalation of formaldehyde has been shown to cause cancer in laboratory animals.

TRW-00251

NFPA Code
 Health 2
 Flammability 3
 Reactivity 0

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 9734-6C76J
 DATE OF PREP. February 27, 1989

Section I

MANUFACTURER: RAFFI & SWANSON, INC.
 100 EAMES STREET
 WILMINGTON, MA 01887

MANUFACTURERS' CODE IDENTIFICATION:

Black Bake Enamel 9734-6C76J

EMERGENCY TELEPHONE NO.: 617-933-4200

PRODUCT CLASS: Solvent Based Coating

TRADE NAME: None

THIS PRODUCT IS A MIXTURE CONTAINING ONE OR MORE HAZARDOUS INGREDIENTS.

INFORMATION ON THE COMPOSITION OF RAFFI & SWANSON, INC. PRODUCTS IS CONFIDENTIAL PROPRIETARY INFORMATION AND IS PROVIDED SOLELY TO AID IN SAFE HANDLING OF THESE MATERIALS. USE OR DISCLOSURE FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

Section II — HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	APPROX. PERCENT BY WEIGHT	TLV		LEL % BY VOL	VAPOR PRESSURE mm of Hg
			PPM	mg/M ³		
Propylene Glycol Methyl Ether (Dowanol PM)	107-98-2	13	100		Not Avail.	8
Zinc Chromate (dispersed in liquid) *C* †	13530-65-9	10 (.96 as Cr)		Not Applicable 0.01 as CR		
Toluol †	108-88-3	9	100		1.2	22
Propylene Glycol Methyl Ether Acetate (Dowanol PM Acetate)	108-65-6	8	None Est.		1.5	3.7
Dipropylene Glycol Methyl Ether (Dowanol DPM)	34590-94-8	6	100		Not Avail.	0.05
Isobutyl Alcohol	78-83-1	5	50		1.7	8
n-Butyl Alcohol-Skin †	71-36-3	3	50		1.4	4.3
Xylol†	1330-20-7	3	100		1.0	5.9
Formaldehyde *C*	50-00-0	0.07	1		Not Applicable--	

† Subject to the reporting requirements of EPA Reg. 40 CFR 372 (SARA Title III, Sec. 313).

C indicates a carcinogen or suspect carcinogen according to ACGIH, OSHA, NTP or IARC.

Section III — PHYSICAL DATA

EVAPORATION RATE: ☐ FASTER ☒ SLOWER, THAN ETHER

VAPOR DENSITY: ☒ HEAVIER ☐ LIGHTER, THAN AIR

BOILING RANGE: 225°-371°F PERCENT VOLATILE BY VOL:

WEIGHT PER GAL:

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION:

FLASH POINT (closed cup): 40°F lowest

LEL: 1.0%

DOT: Flammable Liquid

flashing component

OSHA: Flammable Liquid-Class IB

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, sparks and open flame. Do not apply to hot surfaces. Closed containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Water may be used to cool closed containers. Irritating or toxic gases may be present. Use self-contained breathing apparatus.

TRW-00252

Section V — HEALTH HAZARD DATA (Based on data for individual ingredients)**THRESHOLD LIMIT VALUE** - See Section II**EFFECTS OF OVEREXPOSURE****CHRONIC TOXICITY:** See Section IX.**INHALATION:** Vapor irritating to eyes, nose, and throat. Can cause headache, dizziness, nausea, weakness, loss of consciousness. Prolonged overexposure may cause permanent injury.**SKIN:** Penetrates skin.

Prolonged and repeated contact may cause drying of the skin, and absorption of harmful amounts.

EYE CONTACT: Burning and irritation.**INGESTION:** Do not take internally. May cause nausea, vomiting, diarrhea and other toxic effects.**EMERGENCY AND FIRST AID PROCEDURES****INHALATION:** Provide fresh air. Give artificial respiration or oxygen if necessary. CALL A PHYSICIAN.**SKIN:** Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Wash clothes thoroughly before re-use.**EYE CONTACT:** Flush with water for at least 15 minutes. SEE PHYSICIAN.**INGESTION: DO NOT INDUCE VOMITING.**

If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. CALL A PHYSICIAN.

Section VI — REACTIVITY DATA**STABILITY:** ☐ UNSTABLE ☒ STABLE**HAZARDOUS POLYMERIZATION:** ☐ MAY OCCUR ☒ WILL NOT OCCUR**HAZARDOUS DECOMPOSITION PRODUCTS:** Combustion produces carbon monoxide and carbon dioxide. Unidentified organic compounds may be formed.**MATERIALS AND CONDITIONS TO AVOID:** Strong acids, strong alkalis, strong oxidizers.**Section VII — SPILL OR LEAK PROCEDURES****STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:** Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.**WASTE DISPOSAL METHOD:** Incinerate in approved facility. Do not incinerate closed containers. Dispose in accordance with local, state and federal regulations.**Section VIII — SPECIAL PROTECTION INFORMATION****RESPIRATORY PROTECTION:** Avoid breathing concentrated vapors or overspray particles if sprayed. In confined or poorly ventilated areas, use NIOSH approved mask with chemical canister or supplied air.**VENTILATION:** Provide general mechanical ventilation or local exhaust ventilation sufficient to keep concentration of solvent vapors below 50 PPM**PROTECTIVE GLOVES:** Use chemical resistant, impervious gloves for contact.**EYE PROTECTION:** Safety goggles or face shield where splashes can occur.**OTHER PROTECTIVE EQUIPMENT:****Section IX — SPECIAL PRECAUTIONS****PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:** ☒ FLAMMABLE ☐ COMBUSTIBLE

Keep in closed containers. Avoid sparks or flame when handling. Can be stored under ambient conditions. Keep closures tight and containers upright to prevent leakage.

OTHER PRECAUTIONS: Avoid contact with the skin. Use good personal hygiene practices. Wash hands thoroughly before eating/drinking/smoking/using toilet facilities.

Inhalation of formaldehyde has been shown to cause cancer in laboratory animals.

Contains chromate pigment(suspect carcinogen). If subject to spray application or sanding operation, control exposure level below 0.01mg/m³ as chromium. If controls are not adequate, use respirator.



Raffi and Swanson, Inc.

100 EAMES ST. • WILMINGTON, MASSACHUSETTS 01887 • AREA CODE 617 933-4200

Coatings-Inks-Adhesives

January 1, 1992

To: Our Customers

Subject: SARA Title III, Section 313 Reporting Requirements

Gentlemen:

The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III (Emergency Planning and Community Right-To-Know Act), Section 313 requires that manufacturers who handle certain chemicals in excess of specified quantities report annual releases to the environment.

We are informing you of the presence of Section 313 chemicals in our products (together with CAS numbers and per cent by weight contained in the product by providing this information in the Material Safety Data Sheet for the product. Section 313 chemicals are marked with the symbol "†" and the notation "Subject to the reporting requirements of EPA Reg. 40 CFR (SARA Title III, Sec. 313)".

If you require information on Section 313 reporting requirements, you can call the EPA Emergency Planning and Community Right-To-Know Hotline: (800) 535-0202 in Washington, D.C.

Very truly yours,

RAFFI AND SWANSON, INC.

TRW-00254

THE INFORMATION IN THIS LETTER IS, TO THE BEST OF OUR KNOWLEDGE, TRUE AND ACCURATE. BUT ALL RECOMMENDATIONS AND SUGGESTIONS ARE MADE WITHOUT GUARANTEE. SINCE CONDITIONS OF USE AND STORAGE AFTER LEAVING OUR POSSESSION ARE BEYOND OUR CONTROL, RAFFI AND SWANSON, INC., DISCLAIMS ANY LIABILITY INCURRED IN CONNECTION WITH THE USE OF THESE PRODUCTS AND RECOMMENDATIONS.

0908-1619

247230

HMIS RATING HEALTH (1) FLAMMABILITY (1) REACTIVITY (0) PERSONAL (G)

WHITTAKER CORPORATION/PROVIDENCE CHEMICALS DIVISION

DATE 5/05/89

KING PHILIP ROAD EAST PROVIDENCE, RI 02916

PHONE NO 401-434-1770

EMERGENCY NO CALL CHEMTREC 800-424-9300

SECTION I - PRODUCT IDENTIFICATION

TRADE NO & NAME D4496 BLACK C-O-S

SECTION II - HAZARDOUS INGREDIENTS

#	DESCRIPTION	CAS NO	PERCENT BY WEIGHT	* PPM TWA * ACGIH TLV	* OSHA PEL	LEL	VAPOR PRESSURE mmHg@20C
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PERCENT BY WEIGHT	*mg/M3 TWA* ACGIH TLV	* OSHA PEL
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1	LEAD COMPOUND	*	.698	.15	.05		
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*Subject to reporting requirements of SARA Title III, Section 313

SECTION III - PHYSICAL DATA

BOILING RANGE N/A DEG F
% VOLATILE BY VOLUME NIL
WEIGHT PER GALLON 10.32

VAPOR DENSITY - NOT APPLICABLE
EVAPORATION RATE - NOT APPLICABLE

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

DOT CATEGORY NON-HAZARDOUS FLASH POINT >400 DEG F CC LEL N/A

EXTINGUISHING MEDIA Use National Fire Protection Association (NFPA)
Class B extinguisher carbon dioxide, dry chemical or foam designed to
extinguish NFPA Class I B flammable liquid fires

UNUSUAL FIRE AND EXPLOSION HAZARDS Keep containers tightly closed.
Isolate from heat, electrical equipment, sparks and open flame.
Closed container may explode when exposed to extreme heat. Do not apply
to hot surfaces.

SPECIAL FIRE FIGHTING PROCEDURES Water spray may be ineffective.
Water may be used to cool closed containers to prevent pressure build up
and possible autoignition or explosion when exposed to extreme heat.
If water is used, fog nozzles are preferable.

WHITTAKER CORPORATION/PROVIDENCE CHEMICALS DIVISION
TRADE NO & NAME D4496 BLACK C-O-S

DATE 5/05/89

SECTION V - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE Inhalation: Anesthetic. Irritation of the respiratory tract or acute nervous system, depression characterized by headache, dizziness, staggering gait, confusion, unconsciousness or coma. Skin or Eye Contact: Primary irritation.

EMERGENCY AND FIRST AID PROCEDURES Fumes: Remove from exposure. Restore breathing. Keep warm and quiet. Notify a physician. Splash (eyes): Flush immediately with copious quantities of running water for at least 15 minutes. Take to a physician for a definitive medical treatment. Splash (skin): remove with soap and water. Remove contaminated clothing.

NOTES : The items listed in SECTION II are believed to have the following health effects (See SEC X for explanation)

1:8b,c,d,f;9

SECTION VI - REACTIVITY DATA

STABILITY Stable

HAZARDOUS DECOMPOSITION PRODUCTS May produce hazardous fumes when heated to decomposition as in welding. Fumes may contain carbon monoxide.

HAZARDOUS POLYMERIZATION Will not occur

CONDITIONS TO AVOID Not applicable

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL RELEASED OR SPILLED Ventilate area. Remove with inert absorbent.

WASTE DISPOSAL METHOD Dispose of in accordance with local, state and federal regulations.

** CONTINUED **

WHITTAKER CORPORATION/PROVIDENCE CHEMICALS DIVISION

DATE 5/05/89

TRADE NO & NAME D4496 BLACK C-O-S

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION In outdoor or open areas use Bureau of Mines approved mechanical filter respirator to remove solid air borne particles of overspray during spray application. In restricted ventilation areas use Bureau of Mines approved chemical-mechanical filters designed to remove a combination of particulate and gas and vapor. In confined areas use Bureau of Mines approved air line type respirators or hoods.

VENTILATION Provide general dilution or local exhaust ventilation during spray and/or fusing in volume and pattern to keep TLV of most hazardous ingredient in Section II below acceptable limit, LEL in Section II below stated limit, and to remove decomposition product welding or flame cutting on surfaces coated with this product.

PROTECTIVE GLOVES Required for prolonged or repeated contact.

EYE PROTECTION Use safety eyewear designed to protect against splash of liquids.

OTHER PROTECTIVE EQUIPMENT Prevent prolonged skin contact with contaminated clothing.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Do not store above 120 deg F.

OTHER PRECAUTIONS Do not take internally. Avoid free fall of liquid in excess of a few inches. Do not flame cut, braze, or weld without U.S. Bureau of Mines approved respirator or appropriate ventilation.

** CONTINUED **

TRW-00257

WHITTAKER CORPORATION/PROVIDENCE CHEMICALS DIVISION
TRADE NO & NAME D4496 BLACK C-O-S

DATE 5/05/89

SECTION X SPECIFIC HEALTH HAZARD INFORMATION (SEE SECTION V)

- 8 Repeat exposure may result in damage to or abnormalities of the following: a) liver, b) kidneys, c) brain or nervous system, d) blood, e) lungs, f) reproductive organs, g) skin, h) eyes.
- 9 Repeat exposure may cause fetal death or birth defects.

MATERIAL SAFETY DATA SHEET

PAGE 01

SECTION I - MANUFACTURERS INFORMATION

PRODUCT CODE IDENTITY: 829B310 PRODUCT NAME: WA12EN848 BLACK HI-SOLIDS
 NAME: COOK PATENT AND VARNISH COMPANY DATE OF MSDS: 11/02/88
 ADDRESS: P.O. BOX 419389 KANSAS CITY, MO 64141-6389 EMERGENCY TELEPHONE: 816-391-6000
 INFORMATION TELEPHONE: 816-391-6003

ATTN: SAFETY AND HEALTH OFFICER
 TRW INC FASTENERS DIV
 265 THIRD STREET
 CAMBRIDGE MA 02142

CUSTOMER NUMBER: 543462
 DATE PRINTED: 03/02/89
 COMPLEX: 380

SECTION II - HAZARDOUS INGREDIENTS

CARBON BLACK

CAS #: 001333-86-4 WT. %: LESS THAN 5 VAPOR PRESSURE: N/A
 (MMHG/DEG F)

EXPOSURE LIMIT:
 ACGIH TLV/TWA: 3.5 MG/CU.M.
 OSHA PEL: 3.5 MG/CU.M.

BARIUM SULPHATE, 59% BARIUM (BA)

CAS #: 007727-43-7 WT. %: 5.000 VAPOR PRESSURE: N/A
 (MMHG/DEG F)

EXPOSURE LIMIT:
 ACGIH TLV/TWA: 10MG/CU.M.

TAL (HYDROUS MAGNESIUM SILICATE)

CAS #: 014807-96-6 WT. %: 5.000 VAPOR PRESSURE: N/A
 (MMHG/DEG F)

EXPOSURE LIMIT:
 ACGIH TLV/TWA: 2 MG/CU.M. (RESPIRABLE DUST)
 OSHA PEL: 20 M PPCF

TOLUENE

CAS #: 000108-88-3 WT. %: 5.000 VAPOR PRESSURE: 22.0
 (MMHG/DEG F)

EXPOSURE LIMIT:
 ACGIH TLV/TWA: 100 PPM (375 MG/CU.M.)
 ACGIH TLV/STEL: 150 PPM (560 MG/CU.M.)
 OSHA PEL: 200 PPM (750 MG/CU.M.)
 OSHA PEL/CEILING: 300 PPM (1120 MG/CU.M.)
 OTHER: OSHA: 500 PPM PEAK

N-BUTYL ALCOHOL

CAS #: 000071-36-3 WT. %: 10.000 VAPOR PRESSURE: 4.0
 (MMHG/DEG F)

EXPOSURE LIMIT:
 ACGIH TLV/TWA: 50 PPM (150 MG/CU.M.) SKIN, CEILING
 OSHA PEL: 100 PPM (300 MG/CU.M.)

XYLENE - MIXED ORTHO, META AND PARA ISOMERS

CAS #: 001330-20-7 WT. %: 5.000 VAPOR PRESSURE: 6.0
 (MMHG/DEG F)

EXPOSURE LIMIT:
 ACGIH TLV/TWA: 100 PPM (435 MG/CU.M.)
 ACGIH TLV/STEL: 150 PPM (655 MG/CU.M.)
 OSHA PEL: 100 PPM (435 MG/CU.M.)

TRW-00259

MATERIAL SAFETY DATA SHEET

PRODUCT CODE IDENTITY: 829B310

PRODUCT NAME: WA12EN848 BLACK HI-SOLIDS

SOLVENT NAPHTHA (PETROLEUM) LIGHT AROMATIC

CAS #: 064742-95-6

WT. %: 5.000

VAPOR PRESSURE: 3.0
(MMHG/DEG F)

EXPOSURE LIMIT:

ACGIH TLV/TWA:

NONE ESTABLISHED

OSHA PEL:

NONE ESTABLISHED

OTHER:

SUPPLIER RECOMMENDS: TLV/TWA 50 PPM

ACETONE

CAS #: 000067-64-1

WT. %: LESS THAN 5

VAPOR PRESSURE: 196.0
(MMHG/DEG F)

EXPOSURE LIMIT:

ACGIH TLV/TWA:

750 PPM (1780 MG/CU.M.)

ACGIH TLV/STEL:

1000 PPM (2375 MG/CU.M.)

OSHA PEL:

1000 PPM (2375 MG/CU.M.)

METHYL PROPYL KETONE

CAS #: 000107-87-9

WT. %: LESS THAN 5

VAPOR PRESSURE: 27.8
(MMHG/DEG F)

EXPOSURE LIMIT:

ACGIH TLV/TWA:

200 PPM (700 MG/CU.M.)

ACGIH TLV/STEL:

250 PPM (875 MG/CU.M.)

ISOPROPYL ALCOHOL

CAS #: 000067-63-0

WT. %: 5.000

VAPOR PRESSURE: 33.0
(MMHG/DEG F)

EXPOSURE LIMIT:

ACGIH TLV/TWA:

400 PPM (980 MG/CU.M.)

ACGIH TLV/STEL:

500 PPM (1225 MG/CU.M.)

OSHA PEL:

400 PPM (980 MG/CU.M.)

THIS MATERIAL CONTAINS INGREDIENTS COVERED BY THE CALIFORNIA "SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986" (PROPOSITION 65).

SECTION III - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE TO PRODUCT. PRIMARY ROUTES OF ENTRY ARE:

EYE CONTACT: IRRITATION. SYMPTOMS ARE TEARING, REDNESS AND DISCOMFORT.

SKIN CONTACT: IRRITATION. CAN CAUSE DEFATTING OF SKIN WHICH MAY LEAD TO DERMATITIS.

INHALATION: IRRITATION TO NOSE AND THROAT. EXTENDED OR REPEATED EXPOSURE TO CONCENTRATIONS ABOVE THE RECOMMENDED EXPOSURE LIMITS MAY CAUSE BRAIN OR NERVOUS SYSTEM DEPRESSION, CAUSING DIZZINESS, HEADACHE OR NAUSEA AND IF CONTINUED INDEFINITELY, LOSS OF CONSCIOUSNESS, LIVER AND KIDNEY DAMAGE.

REPORTS HAVE ASSOCIATED REPEATED OR PROLONGED OCCUPATIONAL OVEREXPOSURE TO SOLVENTS WITH PERMANENT BRAIN AND NERVOUS SYSTEM DAMAGE. INTENTIONAL MISUSE BY DELIBERATELY CONCENTRATING AND INHALING THE CONTENTS MAY BE HARMFUL OR FATAL.

INGESTION: MAY CAUSE MOUTH, THROAT, ESOPHAGUS AND STOMACH IRRITATION, NAUSEA, VOMITING AND DIARRHEA.

MEDICAL CONDITIONS THAT MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT:
PREEXISTING EYE, SKIN, LIVER, KIDNEY AND RESPIRATORY DISORDERS.

TRW-00260

0908-1625

PRODUCT CODE IDENTITY: 8293310

PRODUCT NAME: WA12EN848 BLACK HI-SOLIDS

EMERGENCY AND FIRST AID PROCEDURES:

IN CASE OF EYE CONTACT, FLUSH IMMEDIATELY WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES AND GET MEDICAL ATTENTION; FOR SKIN, WASH THOROUGHLY WITH SOAP AND WATER. IF AFFECTED BY INHALATION OF VAPORS OR SPRAY MIST, REMOVE TO FRESH AIR. IF SWALLOWED, GET MEDICAL ATTENTION IMMEDIATELY.

SECTION IV - PHYSICAL DATA

BOILING POINT, DEG. F. 131

VAPOR DENSITY IS HEAVIER THAN AIR

WEIGHT PER GALLON: 9.38

EVAPORATION RATE IS SLOWER THAN ETHER

PERCENT VOLATILE BY VOLUME: 42.354

SECTION V - FIRE AND EXPLOSION HAZARD DATA

OSHA FLAMMABILITY CLASSIFICATION: FLAMMABLE LIQUID CLASS 1B

FLASH POINT SETA CLOSED CUP, DEG F: 0

DOT HAZARD CLASS: RED-LABEL, FLAMMABLE LIQUID

LEL: 1.00

EXTINGUISHING MEDIA: FOAM, CARBON DIOXIDE, DRY CHEMICAL, WATER FOG.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

EXTREMELY FLAMMABLE. VAPORS MAY CAUSE FLASH FIRE. KEEP CONTAINERS TIGHTLY CLOSED AND ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS AND FLAME. NEVER USE WELDING OR CUTTING TORCH ON OR NEAR DRUM (EVEN EMPTY) BECAUSE PRODUCT (EVEN JUST RESIDUE) CAN IGNITE EXPLOSIVELY.

IF APPLIED IN CONFINED AREAS AND TANKS, USE ONLY EXPLOSION-PROOF AND PROPERLY GOUNDED EQUIPMENT, SPARK-PROOF TOOLS AND SPARK-PROOF SHOES.

SPECIAL FIRE FIGHTING PROCEDURES:

FULL PROTECTIVE EQUIPMENT INCLUDING SELF-CONTAINED BREATHING APPARATUS SHOULD BE USED. WATER SPRAY MAY BE INEFFECTIVE. IF WATER IS USED, FOG NOZZLES ARE PREFERABLE. WATER MAY BE USED TO COOL CLOSED CONTAINERS TO PREVENT PRESSURE BUILD-UP AND POSSIBLE AUTO-IGNITION OR EXPLOSION WHEN EXPOSED TO EXTREME HEAT

SECTION VI - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: NONE UNDER NORMAL CONDITIONS.

CONDITIONS TO AVOID: ELEVATED TEMPERATURES.

INCOMPATIBILITY (MATERIALS TO AVOID):

STRONG ACIDS AND STRONG OXIDIZING AGENTS. IF THIS PRODUCT IS NOT WATER REDUCIBLE, AVOID WATER.

HAZARDOUS DECOMPOSITION PRODUCTS:

THERMAL DECOMPOSITION OR COMBUSTION CAN PRODUCE FUMES CONTAINING ORGANIC ACIDS, CARBON DIOXIDE AND CARBON MONOXIDE.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

REMOVE ALL SOURCES OF IGNITION (FLAMES, HOT SURFACES, AND ELECTRICAL, STATIC, OR FRICTIONAL SPARKS). AVOID BREATHING VAPORS. VENTILATE AREA. CONTAIN AND REMOVE WITH INERT ABSORBENT AND NON-SPARKING TOOLS.

WASTE DISPOSAL METHOD:

DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS. DO NOT INCINERATE CLOSED CONTAINERS. INCINERATE IN APPROVED FACILITY.

TRW-00261

0908-1626

PRODUCT CODE IDENTITY: 829B310

PRODUCT NAME: #A12EN848 BLACK HI-SOLIDS

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:

DO NOT BREATHE VAPORS OR SPRAY MIST. WEAR AN APPROPRIATE, PROPERLY FITTED RESPIRATOR (NIOSH/MSHA APPROVED) DURING APPLICATION AND OTHER USE OF THIS PRODUCT UNTIL VAPORS AND MISTS ARE EXHAUSTED, UNLESS AIR MONITORING DEMONSTRATES VAPOR AND MIST LEVELS ARE BELOW APPLICABLE LIMITS. FOLLOW RESPIRATOR MANUFACTURER'S DIRECTIONS FOR RESPIRATOR USE. USE APPROVED CHEMICAL/MECHANICAL FILTERS DESIGNED TO REMOVE A COMBINATION OF PARTICLES AND VAPORS. IN CONFINED AREAS, USE APPROVED AIR SUPPLIED RESPIRATORS OR HOODS. OBSERVE OSHA STANDARD 29CFR 1910.134.

VENTILATION:

PROVIDE GENERAL CLEAN AIR DILUTION OR LOCAL EXHAUST VENTILATION IN VOLUME AND PATTERN TO KEEP THE AIR CONTAMINANT CONCENTRATION BELOW THE LOWER EXPLOSION LIMIT AND BELOW CURRENT APPLICABLE EXPOSURE LIMITS IN THE MIXING, APPLICATION AND CURING AREAS; AND TO REMOVE DECOMPOSITION PRODUCT DURING WELDING AND FLAME CUTTING ON SURFACES COATED WITH THIS PRODUCT. IN CONFINED AREAS, USE ONLY WITH FORCED VENTILATION ADEQUATE TO KEEP VAPOR CONCENTRATION BELOW 20% OF LOWER EXPLOSION LIMITS. REFER TO OSHA STANDARDS 29CFR 1910.94, 1910.107, 1910.108.

NOTE: HEAVY SOLVENT VAPORS SHOULD BE REMOVED FROM LOWER LEVELS OF THE WORK AREA AND ALL IGNITION SOURCES (NONEXPLOSION-PROOF MOTORS, ETC.) SHOULD BE ELIMINATED.

PROTECTIVE GLOVES: USE SOLVENT IMPERMEABLE GLOVES TO AVOID CONTACT WITH PRODUCT

EYE PROTECTION:

DO NOT GET IN EYES. USE SAFETY EYEWEAR WITH SPLASH GUARDS OR SIDE SHIELDS. CHEMICAL GOGGLES, FACE SHIELDS.

OTHER PROTECTIVE EQUIPMENT:

AVOID CONTACT WITH SKIN. USE PROTECTIVE CLOTHING. PREVENT CONTACT WITH CONTAMINATED CLOTHING. WASH CONTAMINATED CLOTHING, INCLUDING SHOES, BEFORE REUSE.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

DO NOT STORE ABOVE 120 DEG. F. STORE LARGE QUANTITIES IN BUILDINGS DESIGNED TO COMPLY WITH OSHA 1910.106. KEEP AWAY FROM HEAT, SPARKS AND FLAME. KEEP CONTAINERS CLOSED WHEN NOT IN USE AND UPRIGHT TO PREVENT LEAKAGE.

OTHER PRECAUTIONS:

CONTAINERS SHOULD BE GROUNDED WHEN POURING. AVOID FREE FALL OF LIQUIDS IN EXCESS OF A FEW INCHES. DO NOT TAKE INTERNALLY. WASH HANDS AFTER USING AND BEFORE SMOKING OR EATING. EMPTIED CONTAINERS MAY RETAIN HAZARDOUS RESIDUE AND EXPLOSIVE VAPORS. KEEP AWAY FROM HEAT, SPARKS AND FLAMES. DO NOT CUT, PUNCTURE OR WELD ON OR NEAR EMPTIED CONTAINERS. FOLLOW ALL HAZARD PRECAUTIONS GIVEN IN THIS DATA SHEET UNTIL CONTAINER IS THOROUGHLY CLEANED OR DESTROYED. IF THIS PRODUCT IS BLENDED WITH OTHER COMPONENTS SUCH AS THINNERS, CONVERTER, COLORANTS, CATALYSTS PRIOR TO USE, READ ALL WARNING LABELS. ANY MIXTURE OF COMPONENTS WILL HAVE HAZARDS OF ALL COMPONENTS. FOLLOW ALL PRECAUTIONS. IF SPRAYING THIS MATERIAL KEEP SPRAY BOOTHS CLEAN. AVOID BUILD-UP OF SPRAY DUST OR OVERSPRAY IN BOOTHS OR DUCTS.

KEEP OUT OF REACH OF CHILDREN

FOR INDUSTRIAL USE ONLY

SECTION X - SARA TITLE III INFORMATION

THIS PRODUCT CONTAINS THE FOLLOWING TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF SARA TITLE III EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT OF 1986 AND OF 40 CFR PART 372.

TRW-00262

0908-1627

MATERIAL SAFETY DATA SHEET

PRODUCT CODE IDENTITY: 929B310

PRODUCT NAME: WA12EN848 BLACK HI-SOLIDS

CHEMICAL NAME	CAS NUMBER	% BY WEIGHT	SARA TITLE III SECTION 311 AND 312 HAZARD CATEGORIES
BARIUM SULPHATE, 59% BARIUM (BA)	007727-43-7	5.6160	DELAYED (CHRONIC)
TOLUENE	000108-88-3	4.6300	IMMEDIATE (ACUTE) DELAYED (CHRONIC) FIRE HAZARD
N-BUTYL ALCOHOL	000071-36-3	9.5220	IMMEDIATE (ACUTE) DELAYED (CHRONIC) FIRE HAZARD
XYLENE - MIXED ORTHO, META AND PARA ISOMERS	001330-20-7	2.9700	IMMEDIATE (ACUTE) DELAYED (CHRONIC) FIRE HAZARD
ACETONE	000067-64-1	1.6560	IMMEDIATE (ACUTE) DELAYED (CHRONIC) FIRE HAZARD

DISCLAIMER AND LIMITATION OF LIABILITY

TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS
/ CURATE. TO THE EXTENT ALLOWED BY LAW, THIS STATEMENT IS MADE IN LIEU OF ANY
/ ER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY
IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND IS
IN LIEU OF ANY OTHER OBLIGATIONS OR LIABILITY ON THE PART OF COOK PAINT AND
VARNISH COMPANY.

COOK PAINT AND VARNISH COMPANY WILL NOT BE LIABLE FOR ANY INCIDENTAL OR
CONSEQUENTIAL DAMAGES. FINAL DETERMINATION OF THE SUITABILITY OF THE MATERIAL
FOR THE USE CONTEMPLATED, THE MANNER OF USE, AND WHETHER THE SUGGESTED USE
INFRINGES ANY PATENT IS THE SOLE RESPONSIBILITY OF THE BUYER.

TRW-00263

0908-1628

MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME OR NUMBER (as it appears on label) 715-BP-8 Black Iron Oxide		GM COMMON CODE
MANUFACTURER'S NAME Magni Industries, Inc.		EMERGENCY TELEPHONE NO. (313) 843-7855
ADDRESS (Number, Street, City, State and Zip Code) 2771 Hammond, Detroit, MI 48209		MANUFACTURER'S D-U-N-S NO. 09-541-3050
HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO. (49 CFR 172.101) Paint - Flammable Liquid UN 1263		
ADDITIONAL HAZARD CLASSES (as applicable) n/a		
CHEMICAL FAMILY Paint Coating	FORMULA n/a	

SECTION II — INGREDIENTS (list all ingredients)

CAS REGISTRY NO.	%W	%V	CHEMICAL NAME(S)	Listed as a Carcinogen in NTP, IARC or OSHA 1910(2) (specify)
11113-70-5	T		Basic Lead Silica Chromate	ACGIH (A2)
53-60-5	20-30		Dibasic Ester	n/a
1330-20-7	T		Xylol	n/a
13530-65-9	T		Zinc Chromate	IARC (2)
108-65-6	10-15		P.M. Acetate	n/a

SECTION III — PHYSICAL DATA

BOILING POINT 190 °F 93 °C	SPECIFIC GRAVITY (H ₂ O = 1) 1.38	
VAPOR PRESSURE 5.0 mm Hg	PERCENT VOLATILE BY VOLUME (%) 15	PERCENT SOLID BY WEIGHT (%) 85
VAPOR DENSITY (AIR = 1) 1.16	EVAPORATION RATE (Butyl Acetate = 1) 1	
SOLUBILITY IN WATER Not soluble	pH = n/a	
APPEARANCE AND ODOR Black in color, odor-aromatic		IS MATERIAL GAS PASTE <u>LIQUID</u> SOLID POWDER

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 98 °F 37 °C	method used	FLAMMABLE LIMITS LEL 5 UEL
EXTINGUISHING MEDIA Foam, dry chemical or carbon dioxide. Water may not be used.		
SPECIAL FIRE FIGHTING PROCEDURES Fight as a volatile liquid fire. Use water to keep fire exposed containers cool to reduce pressure.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Keep away from heat, sparks and open flames.		

TRW-00264

0908-1629

SECTION V-HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE — Conditions to Avoid		THRESHOLD LIMIT VALUE <input checked="" type="checkbox"/>	PERMISSIBLE EXPOSURE LIMIT <input type="checkbox"/> 100PPM
Eye contact can cause severe irritation		OTHER LIMIT <input type="checkbox"/>	
and redness. Skin contact can cause moderate irritation.			
PRIMARY ROUTES OF ENTRY Inhalation <input type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Other (specify) _____			
EMERGENCY AND FIRST AID PROCEDURES			
Eyes-flush with water. If irritation exists, consult a physician.			
Skin contact-wash with soap and water. If swallowed-do not induce vomiting. Call a physician.			

SECTION VI-REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (materials to avoid) When in a liquid avoid mixing with water.			
HAZARDOUS DECOMPOSITION PRODUCTS: n/a			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Large spills may be scooped up with non-sparking tools. Small quantities can be picked up with absorbent material.	
WASTE DISPOSAL METHOD	
Dispose in accordance with 49 CFR 172.101	
CECLA (Superfund) REPORTABLE QUANTITY (in lbs) 500 lbs.	
RCRA HAZARDOUS WASTE NO. (40 CFR 201.22) n/a	
VOLATILE ORGANIC COMPOUND (VOC) (as packaged, minus water)	
<input checked="" type="checkbox"/> Theoretical 15.8 lb/gal	<input type="checkbox"/> Analytical _____ lb/gal

SECTION VIII-SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type) NIOSH approved respiratory if necessary		
VENTILATION	LOCAL EXHAUST (Specify Rate) _____	SPECIAL
	MECHANICAL (General) (Specify Rate) X	OTHER
PROTECTIVE GLOVES (specify type) Rubber gloves		EYE PROTECTION (specify type) Goggles or side shields
OTHER PROTECTIVE EQUIPMENT Eye wash and safety showers should be available.		

SECTION IX-SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Store away from high temperatures, sparks and open flames. Avoid storage outside.	
OTHER PRECAUTIONS	
Ground containers when pouring and limit free fall to a few inches to avoid static sparks.	

Seller agrees not to assert any claim (other than a claim for a patent infringement) against General Motors Corporation for any use or disclosure of any technical data or information disclosed in connection with this questionnaire.

PLEASE COMPLETE QUESTIONNAIRE AND RETURN TO:	Name (print) Paul Badyrka
	Signature _____
	Title Tech Service
	Date _____

TRW-00265

3/2/84 copy
Grip
to 10
to 10
to 10

GEORGE
MANN
& COMPANY, INC.

105 CHURCH STREET
STONEHAM, MA 02180
(617) 438-1338

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under OSHA Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME GEORGE MANN & CO., INC.		EMERGENCY TELEPHONE NO. 401-781-5600
ADDRESS (Number, Street, City, State, and ZIP Code) HARBORSIDE BLVD., PROVIDENCE, R. I. 02940		
CHEMICAL NAME AND SYNONYMS SODIUM HYPOCHLORITE 15%		TRADE NAME AND SYNONYMS Bleach (La Barraque's Sol.)
CHEMICAL FAMILY Oxidizing	FORMULA NaOCl 7681-52-9	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Strong oxident, Never mix with Acids or Organics		
except under controlled conditions.		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.) Decomposes	SPECIFIC GRAVITY (H ₂ O=1) @ 60° F 1.210
VAPOR PRESSURE (mm Hg.) Not Avail.	PERCENT. VOLATILE BY VOLUME (%)
VAPOR DENSITY (AIR=1) Not Avail.	EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Completely soluble cold water, decomposed by hot water	
APPEARANCE AND ODOR	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) None	FLAMMABLE LIMITS None	LoI	UoI
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES Self contained gas masks in case Chlorine is involved.			
UNUSUAL FIRE AND EXPLOSION HAZARDS Danger of Chlorine gas being involved.			

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	Not available
EFFECTS OF OVEREXPOSURE	Not normally dangerous
EMERGENCY AND FIRST AID PROCEDURES	
Rinse with copious quantities of water. Call a Physician.	

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID Heat, Acids, Organics
	STABLE		
INCOMPATIBILITY (Materials to avoid) Heat, Fire.			
HAZARDOUS DECOMPOSITION PRODUCTS Chlorine			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Rinse or flush with large amounts of water. Avoid contamination of food. Toxic to fish or wild life.	
WASTE DISPOSAL METHOD	
Dilute with large volumes of water and dispose in proper sewer facility. Contact proper authority of situation. Do not discharge into lakes, streams, ponds or public water.	

SECTION VIII - SPECIAL PROTECTION INFORMATION			
RESPIRATORY PROTECTION (Specify type) Not normally required			
VENTILATION	LOCAL EXHAUST		SPECIAL
	MECHANICAL (General)	Not normally required	OTHER
PROTECTIVE GLOVES Rubber gloves		EYE PROTECTION Chemical goggles	
OTHER PROTECTIVE EQUIPMENT Rubber shoes, Rubber gloves, cotton clothing.			

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Store away from heat, Acids, Organics	
Keep off skin tissue.	
OTHER PRECAUTIONS	
Decomposes with age, heat, light. Store in cool area away from direct sunlight. Rotate stock	

Health 2
Flammability 3
Reactivity 0

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 4292-ZC26B
DATE OF PREP. December 5, 1989

Section I

MANUFACTURER: RAFFI & SWANSON, INC.
100 EAMES STREET
WILMINGTON, MA 01887

MANUFACTURERS' CODE IDENTIFICATION:

Blue Bake Enamel 4292-ZC26B

EMERGENCY TELEPHONE NO.: 617-933-4200

PRODUCT CLASS: Solvent Based Coating

TRADE NAME: None

THIS PRODUCT IS A MIXTURE CONTAINING ONE OR MORE HAZARDOUS INGREDIENTS.

INFORMATION ON THE COMPOSITION OF RAFFI & SWANSON, INC. PRODUCTS IS CONFIDENTIAL PROPRIETARY INFORMATION AND IS PROVIDED SOLELY TO AID IN SAFE HANDLING OF THESE MATERIALS. USE OR DISCLOSURE FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

Section II — HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	APPROX. PERCENT BY WEIGHT	TLV		LEL % BY VOL	VAPOR PRESSURE mm of Hg
			PPM	mg/m ³		
Xylol †	1330-20-7	40	100		1.0	5.9
n-Butyl Alcohol-skin †	71-36-3	6	50		1.4	4.3
Ethyl Benzene †	100-41-4	4	100		1.0	10
Formaldehyde *C*†	50-00-0	0.54	1		--Not Applicable--	

† Subject to the reporting requirements of EPA Reg. 40 CFR 372 (SARA Title III, Sec. 313).

C indicates a carcinogen or suspect carcinogen according to ACGIH, OSHA, NTP or IARC.

Section III — PHYSICAL DATA

EVAPORATION RATE: ☐ FASTER ☒ SLOWER, THAN ETHER

VAPOR DENSITY: ☒ HEAVIER ☐ LIGHTER, THAN AIR

BOILING RANGE: 243°-291°F PERCENT VOLATILE BY VOL: 65%

WEIGHT PER GAL: 9.24#

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION:

DOT: Flammable Liquid

OSHA: Flammable Liquid-Class IB

FLASH POINT (closed cup): 59°F lowest

LEL: 1.0%

flashing component

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, sparks and open flame. Do not apply to hot surfaces.

C: 1 containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Water may be used to cool closed containers. Irritating or toxic gases may be present. Use self-contained breathing apparatus.

TRW-00268

Section V — HEALTH HAZARD DATA (Based on data for individual ingredients)**THRESHOLD LIMIT VALUE** - See Section II**EFFECTS OF OVEREXPOSURE****ACUTE TOXICITY:** See Section IX.**INHALATION:** Vapor irritating to eyes, nose, and throat. Can cause headache, dizziness, nausea, weakness, loss of consciousness. Prolonged overexposure may cause permanent injury.**SKIN:** Penetrates skin.

Prolonged and repeated contact may cause drying of the skin, and absorption of harmful amounts.

EYE CONTACT: Burning and irritation.**INGESTION:** Do not take internally. May cause nausea, vomiting, diarrhea and other toxic effects.**EMERGENCY AND FIRST AID PROCEDURES****INHALATION:** Provide fresh air. Give artificial respiration or oxygen if necessary. CALL A PHYSICIAN.**SKIN:** Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Wash clothes thoroughly before re-use.**EYE CONTACT:** Flush with water for at least 15 minutes. SEE PHYSICIAN.**INGESTION: DO NOT INDUCE VOMITING.**

If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. CALL A PHYSICIAN.

Section VI — REACTIVITY DATA**STABILITY:** ☐ UNSTABLE ☒ STABLE**HAZARDOUS POLYMERIZATION:** ☐ MAY OCCUR ☒ WILL NOT OCCUR**HAZARDOUS DECOMPOSITION PRODUCTS:** Combustion produces carbon monoxide and carbon dioxide. Unidentified organic compounds may be formed.**MATERIALS AND CONDITIONS TO AVOID:** Strong acids, strong alkalis, strong oxidizers.**Section VII — SPILL OR LEAK PROCEDURES****STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:** Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.**WASTE DISPOSAL METHOD:** Incinerate in approved facility. Do not incinerate closed containers. Dispose in accordance with local, state and federal regulations.**Section VIII — SPECIAL PROTECTION INFORMATION****RESPIRATORY PROTECTION:** Avoid breathing concentrated vapors or overspray particles if sprayed. In confined or poorly ventilated areas, use NIOSH approved mask with chemical canister or supplied air.**VENTILATION:** Provide general mechanical ventilation or local exhaust ventilation sufficient to keep concentration of solvent vapors below 50 PPM**PROTECTIVE GLOVES:** Use chemical resistant, impervious gloves for contact.**EYE PROTECTION:** Safety goggles or face shield where splashes can occur.**OTHER PROTECTIVE EQUIPMENT:****Section IX — SPECIAL PRECAUTIONS****PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:** ☒ FLAMMABLE ☐ COMBUSTIBLE

Keep in closed containers. Avoid sparks or flame when handling. Can be stored under ambient conditions. Keep closures tight and containers upright to prevent leakage.

OTHER PRECAUTIONS: Avoid contact with the skin. Use good personal hygiene practices. Wash hands thoroughly before eating/drinking/smoking/using toilet facilities.

Inhalation of formaldehyde has been shown to cause cancer in laboratory animals.

Health NFPA Code 2
Flammability 3
Reactivity 0

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 9734-AT40B
DATE OF PREP. 1/22/86

Section I

MANUFACTURER: RAFFI & SWANSON, INC.
100 EAMES STREET
WILMINGTON, MA 01887

EMERGENCY TELEPHONE NO.: 617-933-4200

MANUFACTURERS' CODE IDENTIFICATION:

9734-AT40B Blue Bake Enamel

PRODUCT CLASS: Solvent Based Coating

TRADE NAME: None

THIS PRODUCT IS A MIXTURE CONTAINING ONE OR MORE HAZARDOUS INGREDIENTS.

INFORMATION ON THE COMPOSITION OF RAFFI & SWANSON, INC. PRODUCTS IS CONFIDENTIAL PROPRIETARY INFORMATION AND IS PROVIDED SOLELY TO AID IN SAFE HANDLING OF THESE MATERIALS. USE OR DISCLOSURE FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

Section II — HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	APPROX. PERCENT BY WEIGHT	TLV		LEL % BY VOL	VAPOR PRESSURE mm of Hg
			PPM	mg/M ³		
Propylene Glycol Methyl Ether (Dowanol PM)	107-98-2	20	100		Not Avail.	8
Propylene Glycol Methyl Ether Acetate (Dowanol PM Acetate)	108-65-5	10	None Est.		1.5	3.7
Dipropylene Glycol Methyl Ether (Dowanol DPM)	34590-94-8	10	None Est. (100 recomm)		Not Avail.	0.05
Toluol	108-88-3	10	100		1.2	22
n-Butyl Alcohol - Skin	71-36-3	< 5	50		1.4	4.3
is Butyl Alcohol	78-83-1	< 5	50		1.7	8
Xylol	1330-20-7	< 5	100		1.0	5.9
Zinc Chromate *C* (dispersed in liquid)	13530-65-9	10 (0.94 asCr)		Not Applicable 0.05asCr	Not Applicable	
Formaldehyde *C*	50-00-0	0.06	1		Not Applicable	

Section III — PHYSICAL DATA

EVAPORATION RATE: ☐ FASTER ☒ SLOWER, THAN ETHER

VAPOR DENSITY: ☒ HEAVIER ☐ LIGHTER, THAN AIR

BOILING RANGE: 225-298°F PERCENT VOLATILE BY VOL: 67%

WEIGHT PER GAL: 9.7#

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION:

FLASH POINT (closed cup): 40°F lowest
flashing component

LEL: 1.0%

DOT: Flammable Liquid
OSHA: Flammable Liquid-Class IB

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, sparks and open flame. Do not apply to hot surfaces. Closed containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Water may be used to cool closed containers. Irritating or toxic gases may be present. Use self-contained breathing apparatus.

TRW-00270

Section V — HEALTH HAZARD DATA (Based on data for individual ingredients)

THRESHOLD LIMIT VALUE - See Section II

EFFECTS OF OVEREXPOSURE

CHRONIC TOXICITY: See Section IX.

INHALATION: Vapor irritating to eyes, nose, and throat. Can cause headache, dizziness, nausea, weakness, loss of consciousness. Prolonged overexposure may cause permanent injury.

SKIN: Penetrates skin.

Prolonged and repeated contact may cause drying of the skin, and absorption of harmful amounts.

EYE CONTACT: Burning and irritation.

INGESTION: Do not take internally. May cause nausea, vomiting, diarrhea and other toxic effects.

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Provide fresh air. Give artificial respiration or oxygen if necessary. CALL A PHYSICIAN.

SKIN: Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Wash clothes thoroughly before re-use.

EYE CONTACT: Flush with water for at least 15 minutes. SEE PHYSICIAN.

INGESTION: DO NOT INDUCE VOMITING.

If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. CALL A PHYSICIAN.

Section VI — REACTIVITY DATA

STABILITY: ☐ UNSTABLE ☒ STABLE

HAZARDOUS POLYMERIZATION: ☐ MAY OCCUR ☒ WILL NOT OCCUR

HAZARDOUS DECOMPOSITION PRODUCTS: Combustion produces carbon monoxide and carbon dioxide. Unidentified organic compounds may be formed.

MATERIALS AND CONDITIONS TO AVOID: Strong acids, strong alkalis, strong oxidizers.

Section VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.

WASTE DISPOSAL METHOD: Incinerate in approved facility. Do not incinerate closed containers. Dispose in accordance with local, state and federal regulations.

Section VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Avoid breathing concentrated vapors or overspray particles if sprayed. In confined or poorly ventilated areas, use NIOSH approved mask with chemical canister or supplied air.

VENTILATION: Provide general mechanical ventilation or local exhaust ventilation sufficient to keep concentration of solvent vapors below _____ PPM

PROTECTIVE GLOVES: Use chemical resistant, impervious gloves for contact.

EYE PROTECTION: Safety goggles or face shield where splashes can occur.

OTHER PROTECTIVE EQUIPMENT:

Section IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: ☒ FLAMMABLE ☐ COMBUSTIBLE

Keep in closed containers. Avoid sparks or flame when handling. Can be stored under ambient conditions. Keep closures tight and containers upright to prevent leakage.

OTHER PRECAUTIONS: Avoid contact with the skin. Use good personal hygiene practices. Wash hands thoroughly before eating/drinking/smoking/using toilet facilities.

Inhalation of Formaldehyde has been shown to cause cancer in laboratory animals.

Contains chromate pigment (suspect carcinogen). If subject to spray application or sanding operation, control exposure level below 0.05mg/m³ as chromium. If controls are not adequate, use respirator.

TRW-00271

Health 2
Flammability 3
Reactivity 0

NFPA Code

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 9734-6AT40B
DATE OF PREP. February 23, 1989

Section I

MANUFACTURER: RAFFI & SWANSON, INC.
100 EAMES STREET
WILMINGTON, MA 01887

MANUFACTURERS' CODE IDENTIFICATION:

Blue Bake Enamel 9734-6AT40B

EMERGENCY TELEPHONE NO.: 617-933-4200

PRODUCT CLASS:

Solvent Based Compound

TRADE NAME: None

THIS PRODUCT IS A MIXTURE CONTAINING ONE OR MORE HAZARDOUS INGREDIENTS.

INFORMATION ON THE COMPOSITION OF RAFFI & SWANSON, INC. PRODUCTS IS CONFIDENTIAL PROPRIETARY INFORMATION AND IS PROVIDED SOLELY TO AID IN SAFE HANDLING OF THESE MATERIALS. USE OR DISCLOSURE FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

Section II — HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	APPROX. PERCENT BY WEIGHT	TLV		LEL % BY VOL	VAPOR PRESSURE mm of Hg
			PPM	mg/M ³		
Propylene Glycol Methyl Ether (Dowanol PM)	107-98-2	18	100		Not Avail.	8
Toluol †	108-88-3	9	100		1.2	22
Propylene Glycol Methyl Ether Acetate (Dowanol PM Acetate)	108-65-6	8	None Est.		1.5	3.7
Dipropylene Glycol Methyl Ether - Skin (Dowanol DPM)	34590-94-8	7	100		Not Avail.	0.05
Isobutyl Alcohol	78-83-1	5	50		1.7	8
n-Butyl Alcohol-Skin †	71-36-3	3	50		1.4	4.3
Xyol †	1330-20-7	3	100		1.0	5.9
Formaldehyde *C*	50-00-0	0.06	1		--Not Applicable--	
Zinc Chromate (dispersed in liquid) *C* †	13530-65-9	8 (0.77 as Cr)	-----Not Applicable----- 0.01 as Cr-----Not Applicable-----			
† Subject to the reporting requirements of EPA Reg. 40 CFR 372 (SARA Title III, Sec. 313).						
C indicates a carcinogen or suspect carcinogen according to ACGIH, OSHA, NTP or IARC.						

Section III — PHYSICAL DATA

EVAPORATION RATE: ☐ FASTER ☒ SLOWER, THAN ETHER

VAPOR DENSITY: ☒ HEAVIER ☐ LIGHTER, THAN AIR

BOILING RANGE: 225°-371°F PERCENT VOLATILE BY VOL: 68%

WEIGHT PER GAL: 9.73

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION:

FLASH POINT (closed cup): 40°F lowest

LEL: 1.0%

DOT: Flammable Liquid

flashing component

OSHA: Flammable Liquid-Class IB

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, sparks and open flame. Do not apply to hot surfaces. Closed containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Water may be used to cool closed containers. Irritating or toxic gases may be present. Use self-contained breathing apparatus.

TRW-00272

Section V — HEALTH HAZARD DATA (Based on data for individual ingredients)**THRESHOLD LIMIT VALUE** - See Section II**EFFECTS OF OVEREXPOSURE****CHRONIC TOXICITY:** See Section IX.**INHALATION:** Vapor irritating to eyes, nose, and throat. Can cause headache, dizziness, nausea, weakness, loss of consciousness. Prolonged overexposure may cause permanent injury.**SKIN:** Penetrates skin.

Prolonged and repeated contact may cause drying of the skin, and absorption of harmful amounts.

EYE CONTACT: Burning and irritation.**INGESTION:** Do not take internally. May cause nausea, vomiting, diarrhea and other toxic effects.**EMERGENCY AND FIRST AID PROCEDURES****INHALATION:** Provide fresh air. Give artificial respiration or oxygen if necessary. CALL A PHYSICIAN.**SKIN:** Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Wash clothes thoroughly before re-use.**EYE CONTACT:** Flush with water for at least 15 minutes. SEE PHYSICIAN.**INGESTION:** DO NOT INDUCE VOMITING.

If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. CALL A PHYSICIAN.

Section VI — REACTIVITY DATA**STABILITY:** ☐ UNSTABLE ☒ STABLE**HAZARDOUS POLYMERIZATION:** ☐ MAY OCCUR ☒ WILL NOT OCCUR**HAZARDOUS DECOMPOSITION PRODUCTS:** Combustion produces carbon monoxide and carbon dioxide. Unidentified organic compounds may be formed.**MATERIALS AND CONDITIONS TO AVOID:** Strong acids, strong alkalis, strong oxidizers.**Section VII — SPILL OR LEAK PROCEDURES****STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:** Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.**WASTE DISPOSAL METHOD:** Incinerate in approved facility. Do not incinerate closed containers. Dispose in accordance with local, state and federal regulations.**Section VIII — SPECIAL PROTECTION INFORMATION****RESPIRATORY PROTECTION:** Avoid breathing concentrated vapors or overspray particles if sprayed. In confined or poorly ventilated areas, use NIOSH approved mask with chemical canister or supplied air.**VENTILATION:** Provide general mechanical ventilation or local exhaust ventilation sufficient to keep concentration of solvent vapors below 50 PPM**PROTECTIVE GLOVES:** Use chemical resistant, impervious gloves for contact.**EYE PROTECTION:** Safety goggles or face shield where splashes can occur.**OTHER PROTECTIVE EQUIPMENT:****Section IX — SPECIAL PRECAUTIONS****PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:** ☒ FLAMMABLE ☐ COMBUSTIBLE

Keep in closed containers. Avoid sparks or flame when handling. Can be stored under ambient conditions. Keep closures tight and containers upright to prevent leakage.

OTHER PRECAUTIONS: Avoid contact with the skin. Use good personal hygiene practices. Wash hands thoroughly before eating/drinking/smoking/using toilet facilities.

Inhalation of formaldehyde has been shown to cause cancer in laboratory animals.

TRW-00273

Man-GILL CHEMICAL COMPANY

23000 ST. CLAIR AVE. • CLEVELAND, OHIO 44117 • 216 - 486-5300 • CHEMTREC 800 - 424-9300

**MATERIAL SAFETY DATA SHEET****Section I**

07863

Identity BON RED	Date Prepared 02/21/86	Date Revised 12/09/85
NFPA CODE HEALTH 2	FLAMMABILITY 1	REACTIVITY 1

Section II — Hazardous Ingredients

Hazardous Ingredients	CAS #	Health Hazards	ACGIH TLV - TWA
PROPYLENE GLYCOL	107-98-2		360 MG/CUM
NO COMPONENT WAS FOUND TO BE CARCINOGENIC IN NTP, IARC OR OSHA 1910(Z)			

Section III — Physical/Chemical Characteristics

Boiling Point 369 DEG F	Specific Gravity (H ₂ O = 1) 1.0
Vapor Pressure (mm Hg) NOT DETERMINED	Percent Volatile By Volume (%) 73
Vapor Density (AIR = Reference) HEAVIER	Evaporation Rate (Ether = Reference) SLOWER
Water Soluble NO	
Appearance and Odor RED LIQUID, MILD ODOR	

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used) 214 DEG F TCC	Flammable Limits LOWEST VALUE	LEL 2.6	UEL
Extinguishing Media CARBON DIOXIDE. DRY CHEMICAL.			
Special Fire Fighting Procedures CONTAINER.	IF EXPOSED TO HEAT, PRESSURE WILL BUILD UP IN		
Unusual Fire and Explosion Hazards FIRES. STATIC ELECTRICITY COULD CAUSE IGNITION.	A STRAIGHT WATER STREAM WOULD SPREAD		

TRW-00274

Man-GILL CHEMICAL COMPANY

MATERIAL SAFETY DATA SHEET

BON RED

07863

Section V — Reactivity Data

STABILITY	Unstable	Conditions to Avoid
	Stable *	AVOID PROLONGED STORAGE AT ELEVATED TEMPERATURES.

INCOMPATIBILITY (Materials to Avoid)

NONE KNOWN

Hazardous Decomposition Products

OXIDES OF CARBON

HAZARDOUS POLYMERIZATION	May Occur	Conditions to Avoid
	Will Not Occur *	NONE

Section VI — Health Hazard Data

Effects of Overexposure **MILD SKIN IRRITANT. HARMFUL IF SWALLOWED. IRRITATING TO THE EYES. INHALATION MAY CAUSE HEADACHE, NAUSEA, AND DIZZINESS.**

Emergency and First Aid Procedures

Eye (Contact): **FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUTES AND CONTACT PHYSICIAN IMMEDIATELY.**

Skin (Contact): **WASH WITH SOAP AND WATER. CONTACT PHYSICIAN IF IRRITATION PERSISTS.**

Ingestion (Swallowing): **DRINK LARGE QUANTITIES OF MILK OR WATER. CONSULT PHYSICIAN IMMEDIATELY.**

Inhalation (Breathing): **REMOVE TO FRESH AIR.**

Section VII — Precautions for Safe Handling & Use

Steps to be taken in Case Material is Released or Spilled

CONTAIN SPILL. ABSORB AND DISPOSE WASTE.

Waste Disposal Method: **DISPOSE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.**

Precautions To be Taken in Handling and Storage **DO NOT STORE OR USE NEAR HEAT, SPARKS, OR FLAME. DO NOT STORE NEAR COMBUSTIBLE MATERIAL. DO NOT STORE IN DIRECT SUNLIGHT. WHEN SANDING DRY FILM, USE NIOSH APPROVED DUST MASK. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE.**

Other Precautions: **SHOWERS AND EYE WASH FOUNTAINS SHOULD BE MADE AVAILABLE WHERE CHEMICALS ARE USED.**

Section VIII — Control Measures

Respiratory Protection (Specify Type)

USE NIOSH APPROVED EQUIPMENT WHEN AIRBORNE EXPOSURE LIMITS ARE EXCEEDED.

Ventilation	Local	RECOMMENDED TO MAINTAIN BELOW TLV
	Mechanical	

Protective Gloves

NEOPRENE RUBBER

Eye Protection

SPLASH GOGGLES OR FACE SHIELD

Other Protective Clothing or Equipment

PROTECTIVE CLOTHING SUFFICIENT TO PREVENT SKIN CONTACT.

Work/Hygienic Practices

WASH THOROUGHLY BEFORE EATING, SMOKING OR USING TOILET FACILITIES.

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MATERIAL SAFETY DATA SHEET

PARKER CHEMICAL COMPANY

32100 Stephenson Hwy., Madison Heights, Michigan 48071

*2/22/85
copy for
D. Zorub*

Date: November 23, 1982

I. PRODUCT IDENTIFICATION:

Product Name: Bonderite 860 Makeup

Code Number: 00278

Identification: Conversion Coating Chemical - Acidic.

II. HEALTH HAZARD DATA

Emergency and First Aid Procedures

EYES: Immediately flush eyes in a directed stream of water for at least 15 minutes while forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. GET MEDICAL ATTENTION.

SKIN: Immediately remove contaminated clothing and shoes. Flush skin thoroughly with water for at least 15 minutes. Rinse clothing. If irritation persists, GET MEDICAL ATTENTION.

INGESTION: Drink large quantities of water. CORROSIVE. DO NOT INDUCE VOMITING. If vomiting occurs, drink more water. GET MEDICAL ATTENTION. Never give anything by mouth to an unconscious person.

Effects of Overexposure

Contact with eyes, skin or mucous membrane can cause irritation, possibly severe.

Precautions

AVOID CONTACT WITH SKIN, EYES, CLOTHING.

Wash thoroughly after handling.

For industrial use only.

TRW-00276

CHEMTREC EMERGENCY (800) 424-9300

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III. HAZARDOUS INGREDIENTS

<u>Ingredients Presenting A Significant Hazard</u>	<u>%</u>	<u>TLV</u>	<u>CAS</u>
Phosphoric acid	9	1 mg/m ³	7664-38-2
Nitric acid	4.6	5 mg/m ³	7697-37-2
Zinc compounds, as zinc (Zn)	5.4	-	-
Sodium chlorate	1.7	-	7775-09-9
Total phosphate, as PO ₄	14.2	-	-

IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: None.

Flammable Limits: Non-flammable.

Extinguishing Media: As required to extinguish surrounding fire.

Unusual Fire and Explosion Hazard: None.

V. SPECIAL PROTECTION

Respiratory Protection: Not normally required.

Ventilation: As necessary to avoid inhalation and contact.

Protective Gloves: Neoprene or Plastic.

Eye and Face Protection: Chemical goggles, face shield.

Other Protective Equipment: As required to avoid contact.

Other Protective Equipment: Eye wash facility and emergency shower should be in close proximity.

VI. PHYSICAL DATA

Boiling Point: 210° - 250°F.

Specific Gravity: 1.45

Solubility in water: Complete.

Appearance and Odor: Colorless, clear liquid, no odor.

pH: Strongly Acidic.

TRW-00277

0908-1642

VII. REACTIVITY DATA

Stability: Stable.

Incompatibility: Keep separate from alkalies.

Hazardous Decomposition Products: None.

Hazardous Polymerization: Will not occur.

VIII. HANDLING AND STORAGE:

We recommend that ALL CHEMICALS be stored and used in locations which will not permit direct access to sanitary or surface drains. These areas should be constructed in such a manner that any chemicals lost can be either salvaged or suitably treated to prevent pollution.

Store drums in a ventilated area away from direct heat and separate from alkalies.

IX. SPILL, LEAK AND DISPOSAL PROCEDURES

Steps To Be Taken In Case Material is Released or Spilled:

Wear protective clothing; respirator.

Dike to contain spill.

Absorb or otherwise collect spill and store in polyethylene or polyethylene-lined steel container.

Flush the contaminated area with water.

Waste Disposal Method:

This chemical is a hazardous waste as defined by EPA Hazardous Waste and Consolidated Permit Regulations (or consult equivalent state regulations).

Hazardous Waste Characteristic: Corrosivity, Title 40 CFR 261.22,
Hazardous Waste Number D002.

This chemical contains phosphates and heavy metals. Waste treatment and neutralization may be required prior to discharge to a sewer.

Wastewater treatment sludges from electroplating (metal treating) operations are normally hazardous waste unless delisted or excepted. (40 Code of Federal Regulations 261.3)

Waste Treatment Information Bulletin: No. 1002
(Available from the Parker Division on request).

TRW-00278

X. REGULATORY STATUS

Clean Water Act

Toxic Pollutant List (Sec. 307): Contains the following chemical(s)/compound(s) which are included on this list.

Zinc

Designated Hazardous Substances (Sec. 311): Contains the following chemical(s)/compound(s) which are included on this list.

Nitric acid and Phosphoric acid

Reportable Quantity: 21,739 pounds, 1,790 gallons.

Based on the reporting requirements for nitric acid.

Department of Transportation:

This chemical is regulated by the Department of Transportation.

Proper Shipping Name: Compound, Rust Preventing, Corrosive Material
NA 1760.

D.O.T. Hazardous Classification: Corrosive Material.

Department of Transportation Label: Corrosive.

Prepared By: S. Whitney



16/00278

TRW-00279

0908-1644



MATERIAL SAFETY DATA SHEET

PARKER CHEMICAL COMPANY

32100 Stephenson Hwy., Madison Heights, Michigan 48071

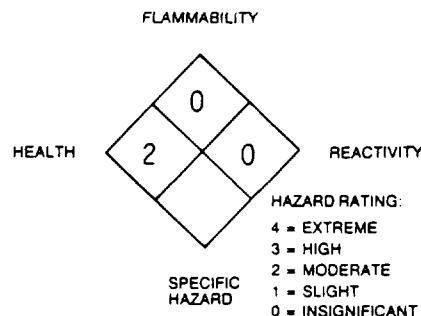
Date: October 4, 1983

I. PRODUCT IDENTIFICATION

Product Name: BONDERITE® 860 Replenishing

Code Number: 00279

Identification: Conversion Coating Chemical - Acidic.



NFPA Designation 704

II. HEALTH HAZARD DATA

Emergency and First Aid Procedures

EYES: Immediately flush eyes in a directed stream of water for at least 15 minutes while forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. GET MEDICAL ATTENTION.

SKIN: Immediately remove contaminated clothing and shoes. Flush skin thoroughly with water for at least 15 minutes. Rinse clothing. If irritation persists, GET MEDICAL ATTENTION.

INGESTION: Drink large quantities of water. CORROSIVE. DO NOT INDUCE VOMITING. If vomiting occurs, drink more water. GET MEDICAL ATTENTION. Never give anything by mouth to an unconscious person.

Effects of Overexposure

Contact with eyes, skin or mucous membrane can cause irritation, possibly severe.

Precautions

AVOID CONTACT WITH SKIN, EYES, CLOTHING.

Wash thoroughly after handling.

For industrial use only.

TRW-00280

CHEMTREC EMERGENCY (800) 424-9300

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0908-1645

III. HAZARDOUS INGREDIENTS

<u>Ingredients Presenting A Significant Hazard</u>	<u>%</u>	<u>TLV</u>	<u>CAS</u>
Phosphoric acid	20	1 mg/m ³	7664-38-2
Nitric acid	2.4	5 mg/m ³	7697-37-2
Zinc compounds, as zinc (Zn)	6	-	-
Sodium chlorate	6.1	-	7775-09-9
Total phosphate, as PO ₄	25	-	-

IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: None.

Flammable Limits: Non-flammable.

Extinguishing Media: As required to extinguish surrounding fire.

Unusual Fire and Explosion Hazard: None.

V. SPECIAL PROTECTION

Respiratory: Not normally required.

Ventilation: As necessary to avoid inhalation and contact.

Protective Gloves: Neoprene or Plastic.

Eye and Face Protection: Chemical goggles, face shield.

Other Protective Equipment: As required to avoid contact.

Other Protective Equipment: Eye wash facility and emergency shower
should be in close proximity.

VI. PHYSICAL DATA

Boiling Point: 210° - 250°F.

Specific Gravity: 1.44

Solubility in water: Complete.

Appearance and Odor: Clear, colorless liquid, no odor

pH: Strongly Acidic.

VII. REACTIVITY DATA

Stability: Stable.

Incompatibility: Keep separate from alkalies.

Hazardous Decomposition Products: None.

Hazardous Polymerization: Will not occur.

VIII. HANDLING AND STORAGE:

We recommend that ALL CHEMICALS be stored and used in locations which will not permit direct access to sanitary or surface drains. These areas should be constructed in such a manner that any chemicals lost can be either salvaged or suitably treated to prevent pollution.

Store drums in a ventilated area away from direct heat and separate from alkalies.

IX. SPILL, LEAK AND DISPOSAL PROCEDURESSteps To Be Taken In Case Material is Released or Spilled:

Wear protective clothing; respirator.

Dike to contain spill.

Absorb or otherwise collect spill and store in polyethylene or polyethylene-lined steel container.

Flush the contaminated area with water.

Waste Disposal Method:

This chemical is a hazardous waste as defined by EPA Hazardous Waste and Consolidated Permit Regulations (or consult equivalent state regulations).

Hazardous Waste Characteristic: Corrosivity, Title 40 CFR 261.22,
Hazardous Waste Number D002.

This chemical contains phosphates and heavy metals. Waste treatment and neutralization may be required prior to discharge to a sewer.

Wastewater treatment sludges from electroplating (metal treating) operations are normally hazardous waste unless delisted or excepted. (40 Code of Federal Regulations 261.3)

Waste Treatment Information Bulletin: No. 1002
(Available on request).

X. REGULATORY STATUSClean Water Act

Toxic Pollutant List (Sec. 307): Contains the following chemical(s)/compounds(s) which are included on this list.

Zinc compounds

Designated Hazard Substances (Sec. 311): Contains the following chemical(s)/compound(s) which are included on this list.

Nitric acid and
Phosphoric acid

Department of Transportation:

This chemical is regulated by the Department of Transportation.

Proper Shipping Name: Compound, Rust Preventing, Corrosive
Material, NA 1760

D.O.T. Hazardous Classification: Corrosive Material.

Department of Transportation Label: Corrosive.

Prepared by: Sulinda Whitney

S. Whitney

8/00279.3

REPORT NUMBER: 971
MSDS NO: P1054
EFFECTIVE DATE: 05/07/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET
RECEIVED

PAGE: 001
VERSION: 010

PRODUCT: BORIC ACID

JUN - 3 1992

ORDER NO:
PROD NO :

VAN WATERS & ROGERS INC. , SUBSIDIARY OF UNIVAR (206)889-3400
6100 CARILLON POINT , KIRKLAND , WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

----- FOR PRODUCT AND SALES INFORMATION -----

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE AT
VW&R BOSTON 508-745-3700 SALEM , MA

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: BORIC ACID

MSDS #: P1054

DATE ISSUED: 05/07/92

CAS NO: 10043-35-3

CHEMICAL NAME AND SYNONYMS: Boric acid, Orthoboric acid

CHEMICAL FAMILY: Borate

FORMULA: H3BO3

PHYSICAL HAZARD RATING: National Fire Protection Association
Health: 0; Flammability: 0; Reactivity: 0

SECTION II - HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT X: Boric Acid >99% CAS #: 10043-35-3

TRW-00284

REPORT NUMBER: 971
MSDS NO: P1054
EFFECTIVE DATE: 05/07/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 002
VERSION: 010

PRODUCT: BORIC ACID

ORDER NO:
PROD NO :

WARNING: This product may contain trace amounts of arsenic, a chemical known to the State of California to cause cancer.

SECTION III - PHYSICAL DATA

APPEARANCE: White, odorless, crystalline solid
SPECIFIC GRAVITY: 1.5128
MELTING POINT: 170.9 Deg. C (340 Deg. F)
SOLUBILITY IN WATER: 20 Deg. C: 4.7%; 100 Deg. C: 27.5%
HEAT OF SOLUTION: 157 BTU/lb. at 18 Deg. C
FORMULA WEIGHT: 61.84
pH at 20 DEG. C: 0.1% solution: 6.1; 1.0% solution: 5.1; 4.7% solution: 3.7

SECTION IV - HEALTH HAZARD INFORMATION

EFFECTS OF ACUTE EXPOSURE:

INGESTION:

ACUTE ORAL LD50: 3.5-4.1 gram/kg of body weight (Sprague-Dawley rats).
HUMAN ACCIDENTAL EXPOSURE: Anticipated symptoms: nausea, vomiting, diarrhea. After 24 hours, erythema; macular skin rash, and dizziness may occur.

EYE: Is a mild eye irritant (rabbits - per 16 CFR 1500.42)

DERMAL:

ACUTE DERMAL LD50: Greater than 2.0 gram/kg of body weight (rabbits - per 16 CFR 1500.40)
PRIMARY SKIN IRRITATION INDEX: 0 (rabbits - per 16 CFR 1500.41)
SKIN: No known adverse effects to humans with intact skin. May be absorbed through damaged skin.
CORROSIVE: This product is non-corrosive.

INHALATION: May cause sneezing and coughing if exposed to high concentrations (>10 mg/m3).

EFFECTS OF CHRONIC OVEREXPOSURE:

INGESTION: Animal testing for carcinogenicity of boric acid has been negative. Animal studies show that ingestion of large amounts of borates over prolonged periods of time causes a decrease in sperm production and testicle size in male laboratory animals and developmental effects in fetuses of pregnant female laboratory animals. No evidence of such effects in humans.

REPORT NUMBER: 971
MSDS NO: P1054
EFFECTIVE DATE: 05/07/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 003
VERSION: 010

PRODUCT: BORIC ACID

ORDER NO:
PROD NO :

EYE: May cause slight reversible conjunctivitis.

DERMAL: No evidence of effect from exposure on intact human skin.

INHALATION: As with any nuisance dusts, may aggravate chronic respiratory ailments such as asthma, bronchitis, etc.

REGULATORY INFORMATION:

OSHA PERMISSIBLE EXPOSURE LIMIT (PEL): Not listed 29CFR1910 Subpart Z

ACGIH RECOMMENDED THRESHOLD LIMIT VALUE: Not listed

NOT LISTED IN THE NATIONAL TOXICOLOGY PROGRAM ANNUAL REPORT ON CARCINOGENS (1989)

NOT LISTED IN THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) MONOGRAPH

NOT LISTED ON THE OSHA CARCINOGENS LIST

EMERGENCY AND FIRST AID PROCEDURES:

EYES: Flush with tepid water for 15 minutes. Consult a physician.

SKIN: Rinse with water.

INHALATION: Remove to fresh air.

INGESTION: Drink large amounts of water or milk. Consult a physician.

NOTE TO PHYSICIAN: Gastric lavage with 5% sodium bicarbonate is suggested. This should be followed by saline catharsis. Assure adequate hydration. Boric acid is not considered an acute poison. After ingestion or absorption into the bloodstream of large amounts (15 grams or more), symptoms may appear after 24-72 hours. Borates are readily dissipated through the urine (70% in the first 24 hours).

SECTION V - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): N/A

FLAMMABLE LIMITS: N/A

EXTINGUISHING MEDIA: None required. Product is an inherent fire retardant.

REPORT NUMBER: 971

MSDS NO: P1054

EFFECTIVE DATE: 05/07/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 004

VERSION: 010

PRODUCT: BORIC ACID

ORDER NO:

PROD NO :

SPECIAL FIREFIGHTING PROCEDURES: None are required. No potential for fire or explosion hazard. Product is an inherent fire retardant.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

SECTION VI - REACTIVITY DATA

STABILITY: Boric acid is a stable product.

INCOMPATIBILITY (MATERIALS TO AVOID): Acetic anhydride; elemental potassium

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with acetic anhydride or elemental potassium may result in explosion.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Sweep or vacuum followed by water rinse.

WASTE DISPOSAL METHOD: Refer to local disposal requirements and regulations for waste disposal methods. Not regulated under Section 313 of SARA Title III or RCRA (40 CFR 261.33).

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATOR PROTECTION: Recommend use of light duty dust mask (such as 3M model 5800) in areas of high airborne concentrations.

VENTILATION: Local exhaust is sufficient.

PROTECTIVE GLOVES: Leather, cloth or rubber gloves

EYE PROTECTION: To avoid eye contact, dust goggles are recommended in areas of high airborne concentrations.

OTHER PROTECTIVE EQUIPMENT: None

TRW-00287

0908-1652

REPORT NUMBER: 971
MSDS NO: P1054
EFFECTIVE DATE: 05/07/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 005
VERSION: 010

PRODUCT: BORIC ACID

ORDER NO:
PROD NO :

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Dry indoor storage.

OTHER PRECAUTIONS: Retain package integrity.

REVISIONS

05/92: Revised entire MSDS (Revision code 009055)

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR VW&R BOSTON
DURING BUSINESS HOURS, PACIFIC TIME (206)889-3400

06/03/92 13:13 PRODUCT: CUST NO: ORDER NO:

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* * * E N D O F M S D S * * *

TRW-00288

0908-1653

0908-1654

SECTION V - HEALTH HAZARD DATA

HEALTH HAZARDS (ACUTE AND CHRONIC - INCLUDE TARGET ORGAN EFFECTS) May cause dermatitis on prolonged contact in sensitive individuals. Polyglycol dimethacrylate - allergen; Polyglycol oleate-irritant; Saccharin-mutagen; Cumene hydroperoxide-mutagen; Methanol-gastrointestinal, irritant, nervous system, ocular; Titanium dioxide-irritant. Silicon Dioxide - amorphous, Blood.	
CONDITIONS TO AVOID None	
SIGNS AND SYMPTOMS OF OVEREXPOSURE May cause dermatitis on prolonged contact in sensitive individuals.	
PRIMARY ROUTES OF ENTRY Inhalation <input type="checkbox"/> Skin Contact <input type="checkbox"/> Other (specify) _____ Not available	
EMERGENCY AND FIRST AID PROCEDURES Eye contact: Flush at least 15 minutes with water. Obtain medical attention. Ingestion: Do not induce vomiting. Keep individual calm. Obtain medical attention. Inhalation: Not applicable. Skin contact: Wash thoroughly with soap and water.	
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE None known	

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	Does not apply.
INCOMPATIBILITY (materials to avoid) None			
HAZARDOUS DECOMPOSITION PRODUCTS: None			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	Does not apply

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Soak up in an inert absorbent. Store in a partly filled, closed container until disposal.	
WASTE DISPOSAL METHOD Incinerate following EPA and local regulations.	
CERCLA (Superfund) REPORTABLE QUANTITY (in lbs.) >555 lbs.	
RCRA HAZARDOUS WASTE NO. (40 CFR 261.33) Does not apply	
VOLATILE ORGANIC COMPOUND (VOC) as packaged, minus water 90-95%	<input checked="" type="checkbox"/> Theoretical 8.7 lb/gal <input type="checkbox"/> Analytical _____ lb/gal

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type) None normally needed		
VENTILATION	LOCAL EXHAUST (specify rate) Does not apply	SPECIAL
	MECHANICAL (general) (specify rate)	OTHER
PROTECTIVE GLOVES (specify type) Rubber or plastic		EYE PROTECTION (specify type) Safety glasses or goggles
OTHER PROTECTIVE EQUIPMENT None normally needed		

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Store below 110°F to preserve shelf life. Avoid prolonged skin contact. Keep away from eyes.	
OTHER PRECAUTIONS None	

TRW-00290

BOWMAN DISTRIBUTION MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME Bowman/Lock-A-Bearing Mount		BOWMAN PART NO. 22010 (page 1 of 3)
SUPPLIER BOWMAN DISTRIBUTION, BARNES GROUP INC.		EMERGENCY TELEPHONE NO. (216) 331-7200
ADDRESS 850 East 72nd Street, Cleveland, OH 44103		DATE 3/13/87
HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO. (49 CFR 172.101) Not restricted		
ADDITIONAL HAZARD CLASSES (as applicable) N.A.		
CHEMICAL FAMILY Anaerobic	FORMULA N.A.	

SECTION II - HAZARDOUS INGREDIENTS

CAS REGISTRY NO.	%W	%V	CHEMICAL NAME(S)	Listed as a Carcinogen in NTP, IARC or OSHA 1910(z) (specify)
25852-47-5	65-70		Polyglycol dimethacrylate	Not listed
39382-25-7	20-25		Bisphenol A Fumarate	Not listed
81-07-2	3-5		Saccharin	NTP, IARC
80-15-9	1-3		Cumene hydroperoxide	Not listed
613-48-9	<1		N,N Dialkyltoluidine	Not listed

SECTION III - PHYSICAL DATA

BOILING POINT <u>>300</u> °F <u> </u> °C		SPECIFIC GRAVITY (H ₂ O = 1)	1.10		
VAPOR PRESSURE @ <u>80</u> °F <u> </u> °C <input checked="" type="checkbox"/> mm Hg <input type="checkbox"/> psi		PERCENT VOLATILE BY VOLUME (%)	<5	PERCENT SOLID BY WEIGHT (%)	25-30
VAPOR DENSITY (AIR = 1)	Unknown	EVAPORATION RATE (<u> </u> = 1)	Unknown		
SOLUBILITY IN WATER	Slight	pH =	N.A.		
APPEARANCE AND ODOR Red liquid, mild odor				MATERIAL IS: LIQUID	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT <u>>200</u> °F <u> </u> °C	method used TCC	FLAMMABLE LIMITS	LEL N.A.	UEL N.A.
EXTINGUISHING MEDIA CO ₂ , Foam, Dry Chemical				
SPECIAL FIRE FIGHTING PROCEDURES None				
UNUSUAL FIRE AND EXPLOSION HAZARDS None				

22010 (page 1 of 3)

0908-1656

TRW-00291

SECTION V - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE - Conditions to avoid Eye irritant. May cause dermatitis on prolonged contact in sensitive individuals.	THRESHOLD LIMIT VALUE N.A.
See attached sheet on chronic hazards.	PERMISSIBLE EXPOSURE LIMIT
	OTHER LIMIT
PRIMARY ROUTES OF ENTRY Inhalation <input type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Other (specify)	
EMERGENCY AND FIRST AID PROCEDURES Ingestion: Do not induce vomiting. Keep person calm. Obtain medical attention. Skin: Flush with water. Eye: Flush with water at least 15 minutes. Obtain medical attention.	

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE	CONDITIONS TO AVOID N.A.	
	STABLE	X	
INCOMPATIBILITY (materials to avoid) None			
HAZARDOUS DECOMPOSITION PRODUCTS: Irritating organic vapors upon combustion.			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID N.A.
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Soak up in an inert absorbent. Store in a partly filled, closed container until disposal.	
WASTE DISPOSAL METHOD Landfill or incinerate following EPA and local regulations.	
CERCLA (Superfund) REPORTABLE QUANTITY (in lbs) N.A.	
RCRA HAZARDOUS WASTE NO. (40 CFR 261.33) N.A.	
VOLATILE ORGANIC COMPOUND (VOC) (as packaged, minus water) 70-75	<input checked="" type="checkbox"/> Theoretical <u>8.9</u> lb/gal
	<input type="checkbox"/> Analytical _____ lb/gal See Theoretical

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type) N.A.		
VENTILATION	LOCAL EXHAUST (specify rate) N.A.	SPECIAL N.A.
	MECHANICAL (general) (specify rate) N.A.	OTHER N.A.
PROTECTIVE GLOVES (specify type) rubber or plastic		EYE PROTECTION (specify type) safety glasses or goggles
OTHER PROTECTIVE EQUIPMENT N.A.		

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Store below 110°F to preserve shelf life. Avoid prolonged skin contact.	
OTHER PRECAUTIONS N.A.	
TRW-00292	

BOWMAN DISTRIBUTION MATERIAL SAFETY DATA SHEET

PRODUCT NAME Bowman/Loctite Shaft & Bearing Mount	BOWMAN PART NO. 22010 (page 3 of 3)
SUPPLIER BOWMAN DISTRIBUTION, BARNES GROUP INC.	EMERGENCY TELEPHONE NO. (216) 391-7200
ADDRESS 850 East 72nd Street, Cleveland, OH 44103	DATE 3/13/87

CHRONIC HAZARDS

Saccharine (sulfimide) has been shown to cause tumors in experimental animals on prolonged, high dose ingestion; by injection into the peritoneum; and by implantation beneath the skin. It is also reported to cause reproductive effects in experimental animals on high dose ingestion.

Cumene hydroperoxide has been shown to cause tumors in experimental animals on injection beneath the skin.

In light of the low concentration of these components in the product, it is our best technical judgement that normal use of this product poses no such hazards.

These warnings are present only to comply with OSHA regulations.

250 Cred.

Health	2
Flammability	0
Reactivity	0
Personal Protection	A

HMIS Ratings

BOWMAN DISTRIBUTION MATERIAL SAFETY DATA SHEET

Health	2
Flammability	0
Reactivity	0
Specific Hazard	

NFPA Ratings

SECTION I

PRODUCT NAME BRAKE CLEANER		BOWMAN PART NO. 19440 (page 1 of 2)
SUPPLIER Bowman Distribution, Barnes Group Inc.		EMERGENCY TELEPHONE NO. (216) 384-7200
ADDRESS 850 East 72nd Street, Cleveland, OH 44103		DATE 1/23/90
HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO. (49 CFR 172.101) Consumer Commodity ORM-D UN 1956		
ADDITIONAL HAZARD CLASSES (as applicable) None		
CHEMICAL FAMILY Mixture	FORMULA TM-620	

SECTION II - HAZARDOUS INGREDIENTS

CAS REGISTRY NUMBER	%W	%V	CHEMICAL NAME(S)	OSHA PEL	ACGIH TLV	STEL Other Limits	Listed as Carcinogen NTP, IARC or OSHA 1910(z) (specify)
71-55-6	73		*1,1,1 Trichloroethane	350	350	450	No
127-18-4	24		*Perchloroethylene	25	50	200	Yes (IARC)
124-38-9	3		Carbon Dioxide	5000	5000	30,000	No

ALL CHEMICAL COMPOUNDS MARKED WITH AN ASTERISK () ARE TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) OF 1986 AND 40 CFR PART 372.

SECTION III - PHYSICAL DATA

BOILING POINT 162-252 °F _____ °C	SPECIFIC GRAVITY (H ₂ O = 1) 1.5		
VAPOR PRESSURE @ 70 °F _____ °C <input type="checkbox"/> mm Hg <input checked="" type="checkbox"/> XX psi	PERCENT VOLATILE BY VOLUME (%) 100	PERCENT SOLID BY WEIGHT (%) N.A.	
VAPOR DENSITY (AIR = 1) Heavier than air	EVAPORATION RATE (BuAc = 1) Butyl Acetate		
SOLUBILITY IN WATER None	PH = N.A.		
APPEARANCE AND ODOR Clear - Solvent odor		MATERIAL IS: LIQUID & GAS	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT _____ °F _____ °C	method used None	FLAMMABLE LIMITS	LEL None	UEL None
EXTINGUISHING MEDIA Use water fog, dry chemical or carbon dioxide.				
SPECIAL FIRE FIGHTING PROCEDURES Aerosol cans may rupture when heated.				
UNUSUAL FIRE AND EXPLOSION HAZARDS Heated cans may burst.				

SECTION V - HEALTH HAZARD DATA

HEALTH HAZARDS (ACUTE AND CHRONIC - INCLUDE TARGET ORGAN EFFECTS) May cause dizziness or narcosis in high vapor concentrations. Will cause defatting of skin. Effects are reversible. Long term exposure (years) to vapor may cause lung, liver or kidney damage. The solvents listed have been reported to affect the central nervous system.	
CONDITIONS TO AVOID See above.	
SIGNS AND SYMPTOMS OF OVEREXPOSURE Inhalation - difficulty in breathing. Skin - redness. Ingestion - vomiting.	
PRIMARY ROUTES OF ENTRY Inhalation <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Other (specify) _____ Ingestion	
EMERGENCY AND FIRST AID PROCEDURES Give oxygen - do not induce vomiting. Gastric lavage. Wash eyes and skin with water.	
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE Heart disease, respiratory disorders	

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	High temperatures
INCOMPATIBILITY (materials to avoid) The above solvents are incompatible with strong oxidizers. Not compatible with active metals.			
HAZARDOUS DECOMPOSITION PRODUCTS: In fire will decompose to carbon dioxide and water, halogen acids, phosgene.			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	None

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Use absorbent sweeping compound to soak up material. Put into container. Dispose as hazardous waste.	
WASTE DISPOSAL METHOD Dispose as hazardous waste in accordance with EPA RCRA.	
CERCLA (Superfund) REPORTABLE QUANTITY (in lbs.) N.E.	
RCRA HAZARDOUS WASTE NO. (40 CFR 261.33) F002	
VOLATILE ORGANIC COMPOUND (VOC) as packaged, minus water) 100	<input checked="" type="checkbox"/> Theoretical 11.5 lb/gal <input type="checkbox"/> Analytical _____ lb/gal

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type) Self contained breathing apparatus if above TLV limit exceeding.		
VENTILATION	LOCAL EXHAUST (specify rate) Provide sufficient ventilation to maintain exposure below TLV(s).	SPECIAL None
	MECHANICAL (general) (specify rate) None	OTHER None
PROTECTIVE GLOVES (specify type) None required if spraying.		EYE PROTECTION (specify type) Wear eye protection.
OTHER PROTECTIVE EQUIPMENT Long sleeves and long pants.		

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Keep away from heat, sparks or open flame. Store at temperatures below 120°F.	
OTHER PRECAUTIONS None.	

TRW-00295

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U.S. DEPARTMENT OF LABOR
Occupational Safety & Health Administration
MATERIAL SAFETY DATA SHEET

SECTION I	
MANUFACTURER'S NAME Frederick Gumm Chemical Company Inc	EMERGENCY TELEPHONE NO. 401-232-0666
ADDRESS (Number, Street, City, State, and ZIP Code) 20 Industrial Drive Smithfield RI 02917	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS Brass Ball Anodes
CHEMICAL FAMILY	FORMULA

SECTION II HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Copper				70-80	1.0 mg
Zinc				20-30	1.0 mg

SECTION III PHYSICAL DATA			
BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H ₂ O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR	Yellow metallic no odor		

SECTION IV FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method used)	NA	FLAMMABLE LIMITS	LeI UeI
EXTINGUISHING MEDIA	CO ₂ or dry chemical		
SPECIAL FIRE FIGHTING PROCEDURES	None		
UNUSUAL FIRE AND EXPLOSION HAZARDS	None		
		TRW-00296	

SECTION V HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	
EFFECTS OF OVEREXPOSURE	Relatively inert - Normal precautions
EMERGENCY AND FIRST AID PROCEDURES	

SECTION VI REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (Materials to avoid)		May react with acids	
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR		

SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Material is solid	
WASTE DISPOSAL METHOD	
Inert	

SECTION VIII SPECIAL PROTECTION INFORMATION			
RESPIRATORY PROTECTION (Specify type)			
VENTILATION	LOCAL EXHAUST		SPECIAL
	MECHANICAL (General)		OTHER
PROTECTIVE GLOVES		NA	EYE PROTECTION
			Normal
OTHER PROTECTIVE EQUIPMENT			

SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
OTHER PRECAUTIONS	

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Occupational Safety & Health Administration
MATERIAL SAFETY DATA SHEET

SECTION I	
MANUFACTURER'S NAME Frederick Gumm Chemical Company Inc	EMERGENCY TELEPHONE NO. 401-232-0606
ADDRESS (Number, Street, City, State, and ZIP Code) 20 Industrial Drive Smithfield RI 02917	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS Brass Ball Anodes
CHEMICAL FAMILY	FORMULA

SECTION II HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Copper				70-80	1.0 mg
Zinc				20-30	1.0 mg

SECTION III PHYSICAL DATA			
BOILING POINT (°F.)	NA		SPECIFIC GRAVITY (H ₂ O = 1)
VAPOR PRESSURE (mm Hg.)			PERCENT VOLATILE BY VOLUME (%)
VAPOR DENSITY (AIR = 1)			EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER			
APPEARANCE AND ODOR Yellow metallic no odor			

SECTION IV FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method used)	NA	FLAMMABLE LIMITS	LeI UeI
EXTINGUISHING MEDIA	CO ₂ or dry chemical		
SPECIAL FIRE FIGHTING PROCEDURES	None		
UNUSUAL FIRE AND EXPLOSION HAZARDS	None		

TRW-00298

SECTION V HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	
EFFECTS OF OVEREXPOSURE	Relatively inert - Normal precautions
EMERGENCY AND FIRST AID PROCEDURES	

SECTION VI REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (Materials to avoid)		May react with acids	
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR		

SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Material is solid	
WASTE DISPOSAL METHOD	
Inert	

SECTION VIII SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type)		
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	OTHER
PROTECTIVE GLOVES	NA	EYE PROTECTION Normal
OTHER PROTECTIVE EQUIPMENT		

SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
OTHER PRECAUTIONS	

Man-GILL CHEMICAL COMPANY

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MATERIAL SAFETY DATA SHEET

Section I				08219
Identity	Date Prepared	12/10/86	Date Revised	02/03/86
BRASS WATER-BORNE AIR DRY	NFPA CODE HEALTH: 2	FLAMMABILITY 3	REACTIVITY 1	
Section II — Hazardous Ingredients				
Hazardous Ingredients	CAS #	Health Hazards	ACGIH TLV - TWA	
BUTYL CELLOSOLVE (2-BUTOXYETHANOL)	111-76-2	SKIN	120 MG/CUM	
AMMONIA	7664-90-5		18 MG/CUM	
NO COMPONENT WAS FOUND TO BE CARCINOGENIC IN NTP, IARC OR OSHA				
Section III — Physical/Chemical Characteristics				
Boiling Point	220 DEG F	Specific Gravity (H ₂ O = 1)	1.01	
Vapor Pressure (mm Hg)	NOT DETERMINED	Percent Volatile By Volume (%)	78	
Vapor Density (AIR = Reference)	HEAVIER	Evaporation Rate (Ether = Reference)	SLOWER	
Water Soluble	YES			
Appearance and Odor				
BRASS LIQUID, MILD ODOR				
Section IV — Fire and Explosion Hazard Data				
Flash Point (Method Used)	ABOVE 200 DEG F TCC	Flammable Limits	LEL	UEL
		LOWEST VALUE	0.9	
Extinguishing Media	CARBON DIOXIDE. DRY CHEMICAL.			
Special Fire Fighting Procedures	IF EXPOSED TO HEAT, PRESSURE WILL BUILD UP IN CONTAINER.			
Unusual Fire and Explosion Hazards	A STRAIGHT WATER STREAM WOULD SPREAD FIRES. STATIC ELECTRICITY COULD CAUSE IGNITION.			

TRW-00300

Man-GILL CHEMICAL COMPANY

MATERIAL SAFETY DATA SHEET

BRASS WATER-BORNE AIR DRY

08219

Section V — Reactivity Data

STABILITY	Unstable Stable *	Conditions to Avoid AVOID PROLONGED STORAGE AT ELEVATED TEMPERATURES
INCOMPATIBILITY (Materials to Avoid) STRONG OXIDIZERS Hazardous Decomposition Products OXIDES OF CARBON		
HAZARDOUS POLYMERIZATION	May Occur Will Not Occur *	Conditions to Avoid NONE

Section VI — Health Hazard Data

Effects of Overexposure	MILD SKIN IRRITANT. HARMFUL IF SWALLOWED. IRRITATING TO THE EYES. INHALATION MAY CAUSE HEADACHE, NAUSEA, AND DIZZINESS.
Emergency and First Aid Procedures	
Eye (Contact):	FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUTES AND CONTACT PHYSICIAN IMMEDIATELY.
Skin (Contact):	WASH WITH SOAP AND WATER. CONTACT PHYSICIAN IF IRRITATION PERSISTS.
Ingestion (Swallowing):	DO NOT INDUCE VOMITING. DRINK LARGE QUANTITIES OF WATER AND/OR MILK. CONSULT PHYSICIAN IMMEDIATELY.
Inhalation (Breathing):	REMOVE TO FRESH AIR.

Section VII — Precautions for Safe Handling & Use

Steps to be taken in Case Material is Released or Spilled	CONTAIN SPILL. ABSORB AND DISPOSE WASTE.
Waste Disposal Method:	DISPOSE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
Precautions To be Taken in Handling and Storage	DO NOT STORE OR USE NEAR HEAT, SPARKS, OR FLAME. DO NOT STORE NEAR COMBUSTIBLE MATERIAL. DO NOT STORE IN DIRECT SUNLIGHT. WHEN SANDING DRY FILM, USE NIOSH APPROVED DUST MASK. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE.
Other Precautions:	SHOWERS AND EYE WASH FOUNTAINS SHOULD BE MADE AVAILABLE WHERE CHEMICALS ARE USED.

Section VIII — Control Measures

Respiratory Protection (Specify Type)	USE NIOSH APPROVED EQUIPMENT WHEN AIRBORNE EXPOSURE LIMITS ARE EXCEEDED.
Ventilation	Local Mechanical RECOMMENDED TO MAINTAIN BELOW TLV
Protective Gloves	NEOPRENE RUBBER
Eye Protection	SPLASH GOGGLES OR FACE SHIELD
Other Protective Clothing or Equipment	PROTECTIVE CLOTHING SUFFICIENT TO PREVENT SKIN CONTACT.

TRW-00301

Work/Hygienic Practices	WASH THOROUGHLY BEFORE EATING, SMOKING OR USING TOILET FACILITIES.
THE INFORMATION PRESENTED HEREIN HAS BEEN COMPILED FROM SOURCES CONSIDERED TO BE DEPENDABLE AND IS ACCURATE TO THE BEST OF SELLER'S KNOWLEDGE, HOWEVER, SELLER MAKES NO WARRANTY WHATSOEVER, EXPRESSED, IMPLIED OR OF MERCHANTABILITY REGARDING THE ACCURACY OF SUCH DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF, SELLER ASSUMES NO RESPONSIBILITY FOR INJURY TO BUYER OR TO THIRD PERSONS OR FOR ANY DAMAGE TO ANY PROPERTY AND BUYER ASSUMES ALL SUCH RISK.	



MATERIAL SAFETY DATA

OCEAN NETWORK EMERGENCY PHONE 1-800-OLIN-911

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THIS PRODUCT MAY BE CONSIDERED TO BE A HAZARDOUS CHEMICAL UNDER THAT STANDARD. (REFER TO THE OSHA CLASSIFICATION IN SEC. I.) THIS INFORMATION IS REQUIRED TO BE DISCLOSED FOR SAFETY IN THE WORKPLACE. THE EXPOSURE TO THE COMMUNITY, IF ANY, IS QUITE DIFFERENT.

I. PRODUCT IDENTIFICATION

REVISION NO : 5
REVISION DATE : 1/01/93¹
PRODUCT CODE : BPE02A000
FILE NUMBER : BPE00112.0001
PRODUCT NAME: BRASSES 2XXX SERIES
SYNONYMS: Brass Alloy, Copper Zinc Alloy- 210, 220, 226, 230, 240, 260, 2613, 262, 268, 270, or 274.
CHEMICAL FAMILY: Copper-Zinc
FORMULA: Not Applicable/Mixture
DESCRIPTION: Metal
OSHA HAZARD CLASSIFICATION: Dust or fume is classified as skin and eye irritant; lung, kidney, nervous system, blood and reproductive toxin.

II. COMPONENT DATA

PRODUCT COMPOSITION

CAS or CHEMICAL NAME: Copper
CAS NUMBER: 7440-50-8
PERCENTAGE RANGE: 61-96%
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS:

	OSHA (PEL)		ACGIH (TLV)	
	ppm	mg/cubic-meter	ppm	mg/cubic-meter
TWA:				
FUME:		0.1		0.2
DUST:		1		1
CEILING:	None		None	
STEL:	None		None	

Oster MSDS # 23
Location Used CT-PA-C5-04-02

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CAS or CHEMICAL NAME: Lead
CAS NUMBER: 7439-92-1
PERCENTAGE RANGE: 0.02-0.10%
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS:

	OSHA (PEL)		ACGIH (TLV)	
	ppm	mg/cubic-meter	ppm	mg/cubic-meter
TWA:		50		0.15
CEILING:	None		None	
STEL:	None		None	

CAS or CHEMICAL NAME: Zinc
CAS NUMBER: 7440-66-6
PERCENTAGE RANGE: Remainder to 100 %
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS:

	OSHA (PEL)		ACGIH (TLV)	
	ppm	mg/cubic-meter	ppm	mg/cubic-meter
TWA:				
FUME:		5		5
DUST:		10		10
RESPIRABLE:		5		None
CEILING:	None			None
STEL:	None			None
FUME:		10		10

III. PRECAUTIONS FOR SAFE HANDLING AND STORAGE

AVOID CONTACT OF DUST OR FUME WITH SKIN, EYES, AND CLOTHING. UPON CONTACT WITH SKIN OR EYES, WASH OFF WITH WATER.

STORAGE CONDITIONS:

DO NOT STORE AT TEMPERATURES ABOVE: Not Applicable

PRODUCT STABILITY AND COMPATIBILITY

SHELF LIFE LIMITATIONS: Not known

INCOMPATIBLE MATERIALS FOR PACKAGING: None known

INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT: None known

IV. PHYSICAL DATA

APPEARANCE: Red/gold metallic color

FREEZING POINT: 930L-1065L/905S-1050S Deg.C

1710L-1950L/1650S-1920S Deg.F

BOILING POINT: Not Applicable

DECOMPOSITION TEMPERATURE: Not Applicable

SPECIFIC GRAVITY: 8.66

BULK DENSITY: 8.66 (g/cc)

pH @ 25 DEG.C: Not Applicable

VAPOR PRESSURE @ 25 DEG.C: Not Applicable

SOLUBILITY IN WATER: Not Applicable

VOLATILES, PERCENT BY VOLUME: Not Applicable

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MATERIAL SAFETY DATA

EVAPORATION RATE: Not Applicable
VAPOR DENSITY: Not Applicable
MOLECULAR WEIGHT: Not Applicable/Mixture
ODOR: None
COEFFICIENT OF OIL/WATER DISTRIBUTION: Not Applicable

V. PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

PERSONAL PROTECTION FOR ROUTINE USE OF PRODUCT:

RESPIRATORY PROTECTION: Respiratory protection not normally needed.
If significant dusting occurs or fumes are generated, wear a NIOSH/MSHA approved dust respirator.

VENTILATION: Local exhaust ventilation is recommended if significant dusting occurs or fumes are generated. Otherwise, use general exhaust ventilation.

SKIN PROTECTIVE EQUIPMENT: Use safety glasses.

OTHER: Wear protective gloves.

EQUIPMENT SPECIFICATIONS (WHEN APPLICABLE) :

RESPIRATOR TYPE: Wear NIOSH/MSHA approved respirator with HEPA filters.

PROTECTIVE CLOTHING TYPE (This includes: gloves, boots, apron and protective suit.) : Impervious

VI. FIRE AND EXPLOSION HAZARD INFORMATION

FLAMMABILITY DATA:

FLAMMABLE: No

COMBUSTIBLE: No

PYROPHORIC: No

FLASH POINT: Not Applicable

AUTOIGNITION TEMPERATURE: Not Applicable

FLAMMABLE LIMITS AT NORMAL ATMOSPHERIC TEMPERATURE AND PRESSURE (PERCENT VOLUME IN AIR): LEL: Not Applicable UEL: Not Applicable

NFPA RATINGS: Not Established

HMIS RATINGS:

Health: 2

Flammability: 0

Reactivity: 0

Oster MSDS # 23
Location Used 4T-AA-CS-04

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EXTINGUISHING MEDIA:

Use extinguishing media for surrounding products.

FIRE FIGHTING TECHNIQUES AND COMMENTS:

See Section XI for protective equipment for fire fighting.

VII. REACTIVITY INFORMATION**CONDITIONS UNDER WHICH THIS PRODUCT MAY BE UNSTABLE:**

TEMPERATURES ABOVE: Not Applicable

MECHANICAL SHOCK OR IMPACT: No

ELECTRICAL (STATIC) DISCHARGE: No

HAZARDOUS POLYMERIZATION: Will not occur

INCOMPATIBLE MATERIALS: Dust and fume - acetylene, chlorine

HAZARDOUS DECOMPOSITION PRODUCTS: Copper fume, zinc oxide fume

OTHER CONDITIONS TO AVOID: Carbon monoxide during melting

SUMMARY OF REACTIVITY:

OXIDIZER: No

PYROPHORIC: No

ORGANIC PEROXIDE: No

WATER REACTIVE: No

VIII. FIRST AID

EYES: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If eye irritation develops, call a physician.

SKIN: Immediately flush with water for 15 minutes. Wash the contaminated skin with soap and water. If irritation develops, call a physician. If clothing comes in contact with the product, the clothing should be laundered before re-use.

INGESTION: Not a likely route of exposure.

INHALATION: Remove to fresh air. If respiratory irritation develops treat symptomatically.

IX. TOXICOLOGY AND HEALTH INFORMATION**ROUTES OF ABSORPTION**

Skin, Eyes, Inhalation

WARNING STATEMENTS AND WARNING PROPERTIES

MAY BE HARMFUL IF METAL FUME IS INHALED AND EXPOSED TO SKIN OR EYES.

THE FINISHED ALLOY METAL IS NOT HAZARDOUS.

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MATERIAL SAFETY DATA

HUMAN THRESHOLD RESPONSE DATA

ODOR THRESHOLD: There is no data for odor threshold.

IRRITATION THRESHOLD: There is no data for irritation threshold.

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH: The IDLH concentration has not been established for this product.

SIGNS, SYMPTOMS, AND EFFECTS OF EXPOSURE

INHALATION

ACUTE:

If the metal fume is inhaled, mild irritation may result to the throat, upper respiratory tract, and lungs. The metal fume may also produce influenza-like symptoms. These effects usually disappear within 24 hours.

CHRONIC:

Inhalation of large amounts of the dust and/or fume of this product may cause damage to central and peripheral nerves, blood, kidneys, and the fetus. Damage to nerves can result in reduction in motor nerve and muscle function; to blood, anemia.

EYES:

The dust or fume can irritate the eyes with effects consisting of reversible redness, swelling, and mucous discharge to the conjunctiva. No corneal involvement or visual impairment would be expected.

SKIN:

Skin contact with the dust or fume may cause irritation consisting of transient redness. This irritant effect would not result in permanent damage.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Asthma and emphysema may be aggravated by exposure to the dust or fume.

INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY

There are no chemicals known to enhance the toxicity of the product.

ANIMAL TOXICITY

ACUTE TOXICITY:

Inhalation LC 50 - No available data.

Dermal LD 50 - No available data.

Oral LD 50 - No available data.

Irritation: Not a skin or eye irritant.

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AQUATIC TOXICITY:

The toxicity of copper to aquatic organisms varies significantly not only with the species, but also with the physical and chemical characteristics of water, such as its temperature, hardness, turbidity and carbon dioxide content. Copper concentration varying from 0.1 to 1.0 mg/l have been found by various investigators to be not toxic for most fish. However, concentration of 0.015 to 3.0 mg/l have been reported as toxic, particularly in soft water to many kinds of fish, crustacea, mollusks, insects and plankton.

CHRONIC TOXICITY:

There are no known or reported effects from repeated exposure to this product. Inhalation of lead can cause damage to the blood, central and peripheral nervous systems, and kidney. Lead inhibits the production of hemoglobin, the material in the blood which carries oxygen. Anemia may result. Lead also causes damage to peripheral nerves resulting in a decrease in motor nerve and muscle function.

REPRODUCTIVE TOXICITY:

There are no known or reported effects on reproductive function or fetal development to this product. Lead has been shown to affect fetal development and reduce male reproductive function.

CARCINOGENICITY:

This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP, or EPA.

MUTAGENICITY:

This product is not known or reported to be mutagenic.

X. TRANSPORTATION INFORMATION

THIS MATERIAL AS A PRODUCT IS NOT REGULATED AS A DOT HAZARDOUS MATERIAL.

XI. SPILL AND LEAKAGE PROCEDURES

FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC AT 800-424-9300.

REPORTABLE QUANTITY (Per 40 CFR 302.4):

If less than 100 micro meters in size Lead (11b), Zinc (10001b) and Copper (50001b).

SPILL MITIGATION PROCEDURES:

This product may represent an explosion hazard if in the form of dust or powder. Remove all sources of ignition.

AIR RELEASE: Not Applicable

WATER RELEASE: Not Applicable

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MATERIAL SAFETY DATA

LAND SPILL: Response to a spill of this material is not normally required unless it is in the form of dust or powder. Clean up with the use of a vacuum system and/or other method capable of reducing the air borne concentrations.

SPILL RESIDUES: Dispose of per guidelines under Section XII, WASTE DISPOSAL.

PERSONAL PROTECTION FOR EMERGENCY SPILL AND FIRE-FIGHTING SITUATIONS:
No extra protection required beyond that listed in Section V. (In case of fire, use normal fire fighting equipment.)

XII. WASTE DISPOSAL

If this product becomes a waste, it DOES NOT meet the criteria of a hazardous waste as defined under 40 CFR 261, in that it does not exhibit the characteristics of hazardous waste of Subpart C, nor is it listed as a hazardous waste under Subpart D.

If this material becomes a waste it should be sent to metal reclaimer.

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

XIII. ADDITIONAL REGULATORY STATUS INFORMATION

TOXIC SUBSTANCES CONTROL ACT:

The components of this product are listed on the Toxic Substance Control Act inventory.

SUPERFUND AMENDMENT AND REAUTHORIZATION ACT TITLE III: HAZARD CATEGORIES, PER 40 CFR 370.2:

HEALTH:

Immediate (Acute)

Delayed (Chronic)

PHYSICAL:

None

EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW, PER 40 CFR 355, APP.A:

EXTREMELY HAZARDOUS SUBSTANCE - THRESHOLD PLANNING QUANTITY:

None Established

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SUPPLIER NOTIFICATION REQUIREMENTS, PER 40 CFR 372.45:

This mixture or tradename product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.

CHEMICALS LISTED ARE: Copper, zinc (fume or dust)

XIV. ADDITIONAL INFORMATION

No additional information.

XV. MAJOR REFERENCES

1. ACGIH Guide to Protective Clothing. Cincinnati, OH: American Conference of Government Industrial Hygienists, 1987.
2. ANSI Z88.2. Recommended Practice for Respiratory Protection. American National Standards Institute, New York, NY.
3. Baker, C. J., The Fire Fighter's Handbook of Hazardous Materials, 4th Ed., Indiana: Maltese Enterprises, Inc., 1984.
4. Bretherick, L., Handbook of Reactive Chemical Hazards, 3rd Ed., Boston, MA: Butterworths, 1985.
5. Casarett, L. and J. Doull, Eds., Toxicology: The Basic Science of Poisons, 3rd Ed., New York: Macmillan Publishing Co., Inc. 1986.
6. CERIS (Chemical Emergency Response Information System) On Line Database. Association of American Railroads.
7. Chemical Degradation and Permeation Database and Selection Guide for Resistant Protective Materials. Austin, TX.
8. Clayton, G. and F. Clayton, Eds., Patty's Industrial Hygiene and Toxicology, Vol. 2A-C 3rd Ed., New York: John Wiley & Sons, 1981-1982.
9. Code of Federal Regulations, Titles 21, 29, 40 and 49. Washington, DC: U.S. Government Printing Office.
10. Fire Protection Guide on Hazardous Materials, 9th Ed., National Fire Protection Association, Batterymarch Park, Quincy, MA, 1986.
11. Gosselin, R., et al., Gosselin-Clinical Toxicology of Commercial Products, 5th Ed., Baltimore: Williams and Wilkins, 1984.
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13. Hazardline, Occupational Health Services Inc., New York, NY.
14. IARC Monogram on the Evaluation of Carcinogenic Risk of Chemicals to Man., Geneva: World Health Organization, International Agency for Research on Cancer.
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16. Lewis, R. and D. Sweet, Eds., Registry of Toxic Effects of Chemical Substances, 1985-1986, Washington, DC: U.S. Government Printing Office, 1987.
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MATERIAL SAFETY DATA

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19. NIOSH Pocket Guide to Chemical Hazards. Washington, DC: U.S. Government Printing Office, 1985.
20. Olin Respiratory Protection Manual.
21. Sax, N. Irving, Dangerous Properties of Hazardous Materials 6th Ed., New York: Van Nostrand Reinhold Company, 1984.
22. Threshold Limit Values and Biological Exposure Indices for 1988-89. Cincinnati, OH: American Conference of Government Industrial Hygienists, 1987.
23. Toxic Substances Control Act Inventory, Washington, DC: U.S. Government Printing Office, 1986.
24. Handbook on the Toxicology of Metals, Vol. II. L. Friberg, G. F. Nordberg, and V. B. Vouk, eds. Elsevier, New York. 1986.

THE INFORMATION IN THIS MATERIAL SAFETY SHEET SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. OLIN BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION, BUT MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MATERIAL SAFETY DATA SHEET IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT OLIN AT THE PHONE NUMBER LISTED BELOW TO MAKE CERTAIN THAT THIS SHEET IS CURRENT.

OLIN MSDS CONTROL GROUP
Olin Corporation
120 Long Ridge Road
Stamford, CT 06904
Phone Number: (203) 356-3449

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Oster MSDS # 23.
Location Used CT-M-C504



MATERIAL SAFETY DATA SHEET



BRAZING ALLOYS (CADMIUM FREE) (COPPER - PHOSPHOROUS - SILVER)

SECTION 1 - MATERIAL IDENTIFICATION

Manufacturers Name **J. W. Harris Co., Inc.**

Distributor Name (If Applicable) _____

Address **10930 Deerfield Road**

Address **Cincinnati, Ohio 45242**

Emergency Telephone **(513) 891-2000**

MSDS Date **November 1985**

The following table lists the trade name and composition of products covered by this Material Safety Data Sheet. **See Section 2 and especially Section 6 for important health hazard data.**

Trade Name			Cadmium Free Nominal Chemical Composition (%)					Other
			Ag	Cu	Zn	Ni	Sn	
Safety Silv® 9	or	Safety Silv® 1550	9	53	38			
Safety Silv® 20	or	Safety Silv® 1500	20	45	35			
Safety Silv® 25	or	Safety Silv® 1375	25	43	30		2	
Safety Silv® 30	or	Safety Silv® 1410	30	38	32			
Safety Silv® 35	or	Safety Silv® 1350G	35	32	33			
Safety Silv® 40	or	Safety Silv® 1350	40	30.5	29.5			
Safety Silv® 40L	or	Safety Silv® 1400	40	36	24			
Safety Silv® 40Ni2	or	Safety Silv® 1435	40	30	28	2		
Safety Silv® 40Ni5	or	Safety Silv® 1580	40	30	25	5		
Safety Silv® 40T	or	Safety Silv® 1300	40	30	28		2	
Safety Silv® 45	or	Safety Silv® 1370	45	30	25			
Safety Silv® 45M	or	Safety Silv® 1298	45	30	12		1	13Mn
Safety Silv® 50	or	Safety Silv® 1425	50	34	16			
Safety Silv® 50N	or	Safety Silv® 1305	50	20	28	2		
Safety Silv® 54	or	Safety Silv® 1575	54	40	5	1		
Safety Silv® 55	or	Safety Silv® 1355	55	31.5	11.7	1.8		
Safety Silv® 56	or	Safety Silv® 1200	56	22	17		5.0	
Safety Silv® 56N	or	Safety Silv® 1640	56	42		2		
Safety Silv® 58	or	Safety Silv® 1345	57.5	32.5			7.0	3Mn
Safety Silv® 60	or	Safety Silv® 1325	60	25	15			
Safety Silv® 60T	or	Safety Silv® 1115	60	30			10.0	
Safety Silv® 63	or	Safety Silv® 1590	62.5	32.5		5		
Safety Silv® 63T	or	Safety Silv® 1475	63	28.5		2.5	6.0	
Safety Silv® 65	or	Safety Silv® 1330	65	20	15			
Safety Silv® 70	or	Safety Silv® 1360	70	20	10			
Safety Silv® 72	or	Safety Silv® 1435U	72	28				
Safety Silv® 72L	or	Safety Silv® 1400L	71.5	28				.5 Li
Safety Silv® 75	or	Safety Silv® 1450	75	22	3			
Safety Silv® 80	or	Safety Silv® 1490	80	16	4			
Safety Silv® 85	or	Safety Silv® 1780	85					15Mn
Safety Silv® 93	or	Safety Silv® 1635	92.5	7.3				.2 Li

Copper - Phosphorous - Silver

Trade Name	Nominal Chemical Composition (%)			
	Ag	Cu	Sn	P
Stay-Silv® 0		92.9		7.1
Stay-Silv® 0LP		93.2		6.8
Stay-Silv® 0HP		92.6		7.4
Brayzon®	1	92.0		7.0
Stay-Silv® 2	2	91.0		7.0
Stay-Silv® 2LP	2	91.4		6.6
Stay-Silv® 2HP	2	90.6		7.4
Quicksilver®	1.7	90.8	1.5	6.0
Silver 'n Brass®	1.7	90.8	1.5	6.0
Stay-Silv® 5	5	89.0		6.0
Stay-Silv® 5LP	5	89.3		5.7
Stay-Silv® 5HP	5	88.5		6.5
Stay-Silv® 6	6	87.5		6.5
Stay-Silv® 6LP	6	87.8		6.2
Stay-Silv® 6HP	6	86.8		7.2
Dynaflow®	6	87.9		6.1
Stay-Silv® 15	15	80.0		5.0
Stay-Silv® 15LP	15	80.3		4.7
Stay-Silv® 15HP	15	79.6		5.4
Phoson +	15	77.7		7.3

SECTION 2 - HAZARDOUS MATERIALS

Brazing rod or wire is a nonhazardous solid at ambient temperature. Hazards (as defined by OSHA 29CFR 1910.1200) may result from fume generated during brazing. Section 1 lists product designations and composition as manufactured. **IMPORTANT - See Section 6 for information on potential fume hazard resulting from use of the product.**

SECTION 3 - PHYSICAL DATA

Solid wire or rod. Rods may be coated with a chemical flux. Flux coating may be blue or other colors.

SECTION 4 - FIRE AND EXPLOSION DATA

(Nonflammable) Open flame and sparks can ignite combustibles, See ANSI/ASC Z49.1-1983 Section 6.

SECTION 5 - HEALTH HAZARD DATA - BRAZING ALLOYS

TRW-00312

Exposure - Section 1 lists nominal composition of brazing filler metals. Section 6 lists exposure limits for hazardous decomposition products which might be present in fume generated during brazing. Actual exposure should be determined by monitoring fume in the operator's breathing zone.

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Primary Route of Exposure - Inhalation of fume.

Pre-existing medical conditions - Individuals with impaired pulmonary functions or illness may have symptoms exacerbated by fume irritants.

Possible Effects of Exposure - Copper and zinc fume may cause metal fume fever. Short term symptoms may include a metallic taste in the mouth, dryness or irritation of the throat followed by coughing, shortness of breath, nausea, fever, body ache, and chills. Long term exposure to welding fume, gases or dust may contribute to pulmonary irritation or pneumoconiosis. Nickel should be considered a possible carcinogen per OSHA 29 CFR 1910.1200. Certain nickel compounds have been implicated based on experience in some nickel refining operations. The specific compounds, however, have not been determined and a direct association between nickel in welding fume and cancer has not been demonstrated.

Emergency First Aid - Remove from dust or fume exposure. If breathing has stopped, perform artificial respiration. Summon medical aid immediately.

Other Health Considerations - Brazing alloys are frequently used with a fluoride type flux. If applicable, flux fume should be considered in evaluation of hazards.

SECTION 6 - REACTIVITY DATA

Hazardous Decomposition Products

Brazing fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being brazed, the process, procedures, and filler metals used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being brazed (such as paint, plating, or galvanizing), the number of operators and the volume of the work area, the quality and amount of ventilation, the position of the operator's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). When the filler metal is consumed, the fume and gas decomposition products generated are different in percent and form from the solid wire or rod ingredients listed in Section 1. Fume and gas decomposition products, and not the ingredients in the rod or wire are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the filler metal. Also, new compounds not in the rod or wire may form. Decomposition products of normal operation include those originating from the volatilization reaction, or oxidation of the wire or rod plus those from the base metal and coating, etc., as noted above.

Section 1 lists composition of the brazing filler metal. The chart below lists those conditions, defined as hazardous, which are likely to be present in the fume.

Element	CAS#	PEL mg/m ³ (1)	TLV mg/m ³ (2)
Silver (metal)	7440-22-4	0.01	0.1
Silver (soluble compounds)	7440-22-4	0.01	0.01
Copper (fume)	7440-50-8	0.1	0.2
Zinc (oxide)	1314-13-2	5.0	5.0 (fume)
Nickel	7440-02-0	1.0	0.3
Tin (oxide)	7440-31-5	2.0	2.0
Manganese	7439-96-5	5.0 (ceiling)	1.0 (fume)

Some of these products are coated with a chemical flux. For flux coated rod the following should be included with the above bare rod fume constituent.

Element	CAS#	PEL	TLV
Boric Acid (Boron Oxide)	1303-86-2	15.0	10.0
Fluorides (F)	Not Listed	2.5	2.5

- (1) Permissible exposure limit OSHA 29CFR 1910.1000 Subpart Z
(2) Threshold limit value American Conference of Government Industrial Hygienists

One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample in the worker's breathing zone. See ANSI/AWS F1. 1 available from the American Welding Society, P.O. Box 351040, Miami, Florida 33135.

SECTION 7 - SPILL OR LEAK PROCEDURES

NOT APPLICABLE

SECTION 8 AND 9 - SPECIAL PROTECTION INFORMATION AND PRECAUTIONS

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, *Safety in Welding and Cutting* published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Washington, D.C. 20402 for more detail on many of the following.

Ventilation

Use enough ventilation, local exhaust at the flame to keep the fumes and gases below TLV's in the worker's breathing zone and the general area. Train the employee to keep his head out of the fumes. See ANSI/ASC Z49.1 Section 5.

Respiratory Protection

Use respirable fume respirator or air supplied respirator when brazing in confined space or where local exhaust or ventilation does not keep exposure below TLV.

Eye Protection

Wear safety glasses, goggles or use face shield with filter lens of appropriate shade number (see ANSI/ASC Z49.1 -Section 4.2). Provide protection screens and flash goggles, if necessary, to shield others.

Protective Clothing

Wear head and body protection which help to prevent injury from radiation, sparks, and flame. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing.

The information and recommendations contained in this publication have been compiled from sources believed to be reliable and to represent the best information on the subject at the time of issue. No warranty, guarantee, or representation is made by Unibrazo Corp. or J.W. Harris Co., Inc. as to the absolute correctness or sufficiency of any representation contained in this and other publications; Unibrazo Corp. and J.W. Harris Co., Inc. assume no responsibility in connection therewith; nor can it be assumed that all acceptable safety measures are contained in this (and other publications), or that other or additional measures may not be required under particular or exceptional conditions or circumstances.



J. W. HARRIS CO., INC.
UNIBRAZE CORP.

10930 DEERFIELD ROAD
7502 WEST STATE RT. 41

CINCINNATI, OHIO 45242
COVINGTON, OHIO 45318

513-891-2000
513-473-2001



MATERIAL SAFETY DATA SHEET

BRAZING FLUXES

Stay Silv White Brazing Flux, Stay Silv Black Brazing Flux

SECTION 1 - MATERIAL IDENTIFICATION

Manufacturers Name **J. W. Harris Co., Inc.**

Distributor Name (If Applicable) _____

Address **10930 Deerfield Road**

Address **Cincinnati, Ohio 45242**

Emergency Telephone **(513) 891-2000**

MSDS Date **November 1985**

SECTION 2 - HAZARDOUS MATERIALS

Composition	% wt.	CAS#	PEL ⁽¹⁾	TLV ⁽²⁾
Boric Acid (Boron Oxide H ₃ BO ₃)	over 5%	1303-86-2	15.0	10.0
Borates (anhydrous)	over 25%	1303-96-4	None	1.0
Fluorides, Fluoborates as F	over 25%	Not Listed	2.5 ⁽³⁾	2.5 ⁽³⁾
Water				

(1) Permissible exposure limit OSHA 29CFR 1910.1000 Subpart Z

(2) Threshold limit value American Conference of Government Industrial Hygienists

(3) A decomposition product may be HF (CAS #7664-39-3) which has a TLV of 2.5 mg/m³.

SECTION 3 - PHYSICAL DATA

Stay Silv White Brazing Flux
Stay Silv Black Brazing Flux

White Paste - No odor.
Brown/Black Paste - No odor.

SECTION 4 - FIRE AND EXPLOSION DATA

Nonflammable material. When heated the material may release fluorides in the fume which may be hazardous.

SECTION 5 - HEALTH HAZARD DATA

Exposure - Section 2 covers ingredients and exposure limits on Stay Silv White and Stay Silv Black Brazing Flux. See section 6 for additional information. Actual exposure limits should be determined by monitoring the fume in the operator's breathing zone.

Primary Route of Exposure - Inhalation of fume. Skin or eye contact is also possible.

Possible Effects of Exposure - Fumes are irritating to skin, eyes and the respiratory tract.

Emergency First Aid - Remove from fume exposure. If breathing has stopped perform artificial respiration. If swallowed, induce vomiting. Never give anything by mouth to an unconscious person. For skin contact, wash with water. For eye contact, immediately flush eyes for 15 minutes with plenty of water. Get medical attention for any irritation.

Other Health Considerations - Fluxes are used with brazing filler metals. When melted, these filler metals may produce fumes which are hazardous. Filler metals may contain cadmium. Fume generated during brazing with cadmium alloys may be toxic. Consult the material safety data sheets that pertain to these products.

SECTION 6 - REACTIVITY DATA

Hazardous Decomposition Products

Brazing fumes and gases cannot be classified simply. The composition and quality of both are dependent upon the metal being brazed, the process, procedures, and filler metals used. Other conditions which also influence the composition and quality of the fumes and gases to which workers may be exposed include: coatings on the metal being brazed (such as paint, plating, or galvanizing), the number of operators and the volume of the work area, the type of brazing alloy used, the quality and amount of ventilation, the position of the operator's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). When the flux and the filler metal are consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 1. Fume and gas decomposition products from the brazing alloy and flux not just the ingredients are important. The concentration of a given fume or a given fume or gas component may decrease by many times the original concentration. Also, new compounds may form. Decomposition products of normal operation include those originating from the volatilization reaction, or oxidation of the wire or rods and flux plus those from the base metal and coating, etc., as noted above.

SECTION 7 - SPILL OR LEAK PROCEDURES

Spill or Leak Procedures - Large spills should be neutralized with a slaked lime-soda ash slurry. Follow Federal, State, and Local regulations for disposal.

SECTION 8 AND 9 - SPECIAL PROTECTION INFORMATION AND PRECAUTIONS

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, *Safety in Welding and Cutting* published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Washington, D.C. 20402 for more detail on many of the following.

Ventilation

Use enough ventilation, local exhaust at the flame to keep the fumes and gases below TLV's in the worker's breathing zone and the general area. Train the employee to keep his head out of the fumes. See ANSI/ASC Z49.1 Section 5.

Respiratory Protection

Use respirable fume respirator or air supplied respirator when brazing in confined space or where local exhaust or ventilation does not keep exposure below TLV.

Eye Protection

Wear goggles or use face shield with filter lens of appropriate shade number (see ANSI/ASC Z49.1 -Section 4.2). Provide protection screens and flash goggles, if necessary, to shield others. Wear face shield if splashing is probable.

Protective Clothing

Wear head and body protection which help to prevent injury from splashing, sparks, or flame. See ANSI Z49.1. At a minimum this includes gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, etc.

The information and recommendations contained in this publication have been compiled from sources believed to be reliable and to represent the best information on the subject at the time of issue. No warranty, guarantee, or representation is made by Unibrazo Corp. or J.W. Harris Co., Inc. as to the absolute correctness or sufficiency of any representation contained in this and other publications; Unibrazo Corp. and J.W. Harris Co., Inc. assume no responsibility in connection therewith; nor can it be assumed that all acceptable safety measures are contained in this (and other publications), or that other or additional measures may not be required under particular or exceptional conditions or circumstances.



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UNIBRAZE CORP.

10930 DEERFIELD ROAD
7502 WEST STATE RT. 41

CINCINNATI, OHIO 45242
COVINGTON, OHIO 45318

513-891-2000
513-473-2001



UDYLITE®

OPERATING INSTRUCTIONS

N-66E

UDYLITE® 66E BRIGHT NICKEL PROCESS

1.0 INTRODUCTION

The UDYLITE® 66E Bright Nickel Process has been developed to produce full, bright deposits with excellent ductility and leveling with low cost, convenient to use additives. The deposits exhibit unusually good receptivity to chromium plate and may be used in a multi-layer nickel sequence over polished steel. The 66E Process produces excellent results in both the CASS (Copper Accelerated Acid Salt Spray) and Corrodokote tests, when used as part of a multi-layer nickel system incorporating proper thicknesses and a chromium topcoat.

2.0 SOLUTION COMPOSITION AND OPERATING CONDITIONS

2.1 Initial Solution Composition

	<u>Optimum</u>	<u>Range</u>
Nickel Sulfate ($\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$)	40 oz/gal (300 g/L)	30 to 50 oz/gal (225 to 357 g/L)
Nickel Chloride ($\text{NiCl}_2 \cdot 6\text{H}_2\text{O}$)	8 oz/gal (60 g/L)	6 to 18 oz/gal (45 to 135 g/L)
Boric Acid (H_3BO_3)	6 oz/gal (45 g/L)	5.5 to 6.5 oz/gal (41 to 50 g/L)
UDYLITE 610 Nickel Brightener*	0.8% by volume	0.6 to 1.5% by volume
UDYLITE 62A Wetting Agent	0.2% by volume	0.1 to 0.5% by volume
UDYLITE 63 Nickel Brightener	1.5% by volume	1.0 to 2.5% by volume
UDYLITE 66E Nickel Brightener	As Required	0.1 to 0.4% by volume

NOTE: *Required for Make-Up only.

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2.2 Operating Conditions

Temperature	145°F (63°C)	135° to 155°F (57° to 68°C)
pH	4.0	3.5 to 4.5
Cathode Current Density	50 A/ft ² (5.4 A/dm ²)	2.0 to 100 A/ft ² (2.2 to 10.8 A/dm ²)
Anode Current Density	30 A/ft ² (3.2 A/dm ²)	10 to 50 A/ft ² (1.0 to 5.4 A/dm ²)
Tank Voltage	9 Volts	6 to 18 Volts

3.0 EQUIPMENT REQUIREMENTS

Tank	Koroseal or rubber approved by Udylite Technical Service Laboratory.
Air Agitation	Low pressure blower producing 1 psi/18 inches of solution depth and 2 CFM/ft ² of solution surface.
Filtration	Continuous filtration through UDYLITE® UDYSORB® Activated Carbon required.
Air Agitation Spiders	CPVC.
Heating and Cooling Coils	Titanium, tantalum, Teflon.
Heating and Cooling Exchangers	Titanium, tantalum, plate-type graphite.
Tank Ventilation	Mandatory. Solution is classified by C-4 by OSHA.
Nickel Anodes	Sulfur depolarized or electrolytic.
Anode Bags	Polypropylene, Dynel, 10 or 12 ounce Canton Flannel, Cotton Duck.

*Consult Udylite Technical Representative for design and/or material recommendations.

4.0 PROCESS MATERIALS REQUIRED

Specify OMI Product Code

Nickel Anodes	Not supplied by OMI
Nickel Sulfate	100310
Nickel Chloride	100308
Boric Acid	100173
UDYLITE 610 Nickel Brightener	100030
UDYLITE 62A Wetting Agent	100047
UDYLITE 63 Nickel Brightener	100036
UDYLITE 66E Nickel Brightener	100037

5.0 PROCESS MAKE-UP

5.1 For each 100 gallons (378 liters)

Additives Required

Nickel Sulfate	250 lb (113 Kg)
Nickel Chloride	50 lb (23 Kg)
Boric Acid	38 lb (17 Kg)
UDYLITE® 610 Nickel Brightener	0.8 gal (3.02 L)
UDYLITE 62A Wetting Agent	0.2 gal (0.75 L)
UDYLITE 63 Nickel Brightener	1.5 gal (7.6 L)

5.2 Make-Up Procedure

To make up a new UDYLITE Bright Nickel Plating Bath refer to Udyllite Technology Supplement TS-N-MU, Method for the Preparation of Udyllite Nickel Solutions. To convert existing bright nickel solutions consult the Udyllite Technical Service Laboratory for specific recommendations.

6.0 PROCESS MAINTENANCE AND CONTROL

6.1 UDYLITE 66E Nickel Brightener is added in conjunction with 63 Brightener to maintain the brightness and leveling.

Low concentrations of 66E Nickel Brightener may result in dull deposits with loss of level. Slight variations of the concentration of 66E Nickel Brightener have little effect on the physical properties of the nickel deposit. Extremely high concentrations may cause reduction of the deposit ductility, as well as dark low current density area deposits.

When making additions of 66E Nickel Brightener, we recommend that the brighteners be diluted with water and distributed uniformly over the surface of the solution. Small frequent additions are also recommended and automatic brightener feeders are the preferred methods of making additions.

Depletion of 66E Nickel Brightener occurs by electrolysis, dragout, operating with insoluble anodes and by batch treatments. It is not appreciably removed by continuous filtration through activated carbon.

Control of 66E Nickel Brightener is best achieved by direct observation of the work or by small scale plating tests using air agitation. Consumption will vary widely in different installations depending on operating conditions, smoothness of the surface being plated and degree of brightness required. A consumption rate of one quart (approximately one liter) for each 2,500 to 4,000 ampere-hours may be used as a guide until a more accurate rate has been established for a specific operation. Analytical procedures are available for determination of the 61 INDEX. (See Recommended Reading Reference.) The 61 INDEX is a relative guide as to the effective consistency of 66E Nickel Brightener additions. It is not the 66E Brightener concentration.

Large additions of 66E Brightener must not be made to adjust the 61 INDEX . Continuously decreasing 61 INDEX values frequently indicate excessive dragout or insufficient additions of 66E Nickel Brightener. Increasing 61 INDEX values indicate unnecessarily high additions of 61 Brightener. In most instances, the 61 INDEX will automatically remain within the recommended range of 0.6 to 1.5 simply by maintaining normal additions of 66E Brightener.

- 6.2 UDYLITE® 63 Nickel Brightener promotes good deposit ductility and reduces the internal stress of the deposit. It operates in conjunction with 66E Nickel Brightener to promote brightness and leveling over a wide current density range. Low concentrations of 63 Nickel Brightener cause loss of deposit ductility. Excesses of 63 Nickel Brightener are not harmful. If 61 INDEX values are maintained at 1.0 to 1.5, the 63 Nickel Brightener should be increased to 2.0% by volume to maintain maximum ductility.

The 63 Nickel Brightener is depleted through electrolysis and dragout. Batch treatments generally remove a portion of the material (0.2% to 0.5% by volume) depending on pH and temperature used.

A consumption rate of one quart (approximately one liter) for each 15,000 ampere-hours may be used until a more accurate rate has been established for a specific installation. The 63 Nickel Brightener can be controlled by the routine analytical procedures (see Recommended Reference Reading).

If plating UDYLITE Bright Nickel on zinc based die castings, refer to Technology Supplement TS-N-J entitled, Use of J or 3J Brightener in UDYLITE Bright Nickel Solution.

- 6.3 UDYLITE 610 Nickel Brightener is used in the preparation of new solutions and the conversion of some types of bright nickel solutions. It should be used, thereafter, only on specific recommendation of Udylite Technical Personnel.
- 6.4 UDYLITE 62A Wetting Agent lowers the surface tension and provides limited detergent action in the nickel solution to insure pit-free deposits. A minimum concentration of 0.1% by volume 62A Wetting Agent must be maintained. At this concentration, a surface tension of about 41 dynes/cm² will be produced. It is advisable to add 62A Wetting Agent in 0.05 to 0.10% by volume increments to avoid excessive foaming*.

The 62A Wetting Agent is depleted by dragout and is substantially removed from the process by batch carbon treatments.

The approximate concentration of 62A Wetting Agent can be determined by surface tension measurements according to the instructions in the Udylite Technology Supplement TSA-1005 Analysis of UDYLITE 62 and 62A Wetting Agent by Surface Tension.

*NOTE: IN OPERATIONS REQUIRING A LOWER FOAMING TYPE WETTING SYSTEM, UDYLITE® 62 WETTING AGENT MAY BE USED. CONSULT UDYLITE TECHNICAL REPRESENTATIVE FOR RECOMMENDATIONS.

7.0 ANALYTICAL PROCEDURES

Consult Udylite Technology Supplement TSA-1001 for the determination of nickel metal, chloride concentration and boric acid. See Recommended Reference Reading Section 9.0 for additional procedures available upon request.

8.0 WASTE TREATMENT

Rinse water containing diluted process solution dragged out of the UDYLITE® 66 Bright Nickel Process may be treated for sewer discharge in the same manner as conventional nickel processes. A more detailed description of the procedures used in waste treatment of nickel rinses is contained in the Udylite Technology Supplement TS-N-GEN entitled, Nickel Electroplating - General Practices.

9.0 RECOMMENDED REFERENCE READING

Udylite Technology Supplement, TS-N-MU entitled, Method for the Preparation of Udylite Nickel Solutions.

Udylite Technology Supplement, TSA-1001 entitled, Analysis of Nickel Plating Solutions.

Udylite Technology Supplement, TS-PUR entitled, Filtration and Purification of Udylite Nickel Solutions.

Udylite Technology Supplement, TSA-1006 entitled, Analysis of 61 INDEX in Udylite Bright Nickel Solutions.

Udylite Technology Supplement, TSA-1007 entitled, Analysis of 63 Nickel Brightener in Udylite Bright Nickel Solutions.

Udylite Technology Supplement, TSA-1005 entitled, Analysis of UDYLITE 62 and 62A Wetting Agents by Surface Tension.

MATERIAL SAFETY DATA SHEETS

For more detailed information on the toxicological properties of the products described herein, reference can be made to the Material Safety Data Sheets for each of these products. If you do not have these, they can be requested from the Manager, Quality Assurance, Udyllite/Sel-Rex, 21441 Hoover Road, Warren, Michigan 48089. For **EMERGENCY** assistance regarding accidents with this product resulting in container rupture, spills, poisoning, bodily injury or threats to health, call **(313) 497-9129**. This number is active 24-hours a day for **EMERGENCY ASSISTANCE ONLY**.

WARRANTY AND DISCLAIMER

The information presented herein is to the best of our knowledge true and accurate and all recommendations and suggestions appearing in these Instructions covering the use of our products are based upon information believed to be reliable. Since the actual use of this product by others is beyond our control, no guarantee, expressed or implied, is made by OMI International Corporation as to the effects of such use or the results to be obtained, nor is any information to be construed as a recommendation to infringe any patent and nothing contained herein shall be construed as a recommendation to use a product in infringement of any existing patent, and we assume no responsibility or liability for operations which do infringe any such patent. OMI International Corporation assumes no liability for incidental, consequential, or direct damages of any kind, no matter what the cause, including negligent use or direct misapplication of this product or any of its components, or failure to regard caution notices directly stated in these Instructions or on product labels. The above includes confidential and proprietary information of OMI International Corporation and is furnished to you for your use solely on product or processes supplied by us to you.

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REGIONAL SALES OFFICES

SOUTHERN REGION:	BTC #519, 454 S. Anderson Road, Rock Hill, SC 29730	(803) 329-9659
CENTRAL REGION	11311 Cornell Park Drive, Suite 106, Cincinnati, OH 45242	(513) 489-1703
EASTERN REGION:	75 River Road, Nutley, NJ 07110	(201) 667-5200
NORTH CENTRAL:	21441 Hoover Road, Warren, MI 48089	(313) 497-9100
WESTERN REGION:	2779 El Presido, Long Beach, CA 90810	(213) 537-0288
CANADA:	58 Adesse Drive, Concord, Toronto, Ontario, Canada L4K 2Y6	(416) 738-1400
WORLD HEADQUARTERS: OMI International Corporation 21441 Hoover Road Warren, MI 48089		(313) 497-9100

Health NFPA Code 2
Flammability 3
Reactivity 0

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 4292-AW68C
DATE OF PREP. August 28, 1990

Section I

MANUFACTURER: RAFFI & SWANSON, INC.
100 EAMES STREET
WILMINGTON, MA 01887

MANUFACTURERS' CODE IDENTIFICATION:

~~Brown Cake Emul~~ 4292-AW68C

EMERGENCY TELEPHONE NO. 617-683-4200

PRODUCT CLASS:

Solvent Based Compound

TRADE NAME: None

THIS PRODUCT IS A MIXTURE CONTAINING ONE OR MORE HAZARDOUS INGREDIENTS.

INFORMATION ON THE COMPOSITION OF RAFFI & SWANSON, INC. PRODUCTS IS CONFIDENTIAL PROPRIETARY INFORMATION AND IS PROVIDED SOLELY TO AID IN SAFE HANDLING OF THESE MATERIALS. USE OR DISCLOSURE FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

Section II — HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	APPROX. PERCENT BY WEIGHT	TLV		LEL % BY VOL	VAPOR PRESSURE mm of Hg
			PPM	mg/m ³		
Xylol †	1330-20-7	44	100		1.0	5.9
n-Butyl Alcohol-skin †	71-36-3	6	50		1.4	4.3
Ethyl Benzene †	100-41-4	4	100		1.0	10
Formaldehyde *C*	50-00-0	0.54	1		--Not Applicable--	

† Subject to the reporting requirements of EPA Reg. 40 CFR 372 (SARA Title III, Sec. 313).

C indicates a carcinogen or suspect carcinogen according to ACGIH, OSHA, NTP or IARC.

Section III — PHYSICAL DATA

EVAPORATION RATE: ☐ FASTER ☒ SLOWER, THAN ETHER

VAPOR DENSITY: ☒ HEAVIER ☐ LIGHTER, THAN AIR

BOILING RANGE: 243°-291°F PERCENT VOLATILE BY VOL: 66%

WEIGHT PER GAL: 8.75#

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION:

FLASH POINT (closed cup): 57°F lowest

LEL: 1.0%

DOT: Flammable Liquid

flashing component

OSHA: Flammable Liquid-Class B

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, sparks and open flame. Do not apply to hot surfaces.
Closed containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Water may be used to cool closed containers. Irritating or toxic gases may be present.
Use self-contained breathing apparatus.

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Section V — HEALTH HAZARD DATA (Based on data for individual ingredients)

THRESHOLD LIMIT VALUE - See Section II

EFFECTS OF OVEREXPOSURE

CHRONIC TOXICITY: See Section IX.

INHALATION: Vapor irritating to eyes, nose, and throat. Can cause headache, dizziness, nausea, weakness, loss of consciousness. Prolonged overexposure may cause permanent injury.

SKIN: Brief contact not expected to be harmful.

Prolonged and repeated contact may cause drying of the skin, and absorption of harmful amounts.

EYE CONTACT: Burning and irritation.

INGESTION: Do not take internally. May cause nausea, vomiting, diarrhea and other toxic effects.

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Provide fresh air. Give artificial respiration or oxygen if necessary. CALL A PHYSICIAN.

SKIN: Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Wash clothes thoroughly before re-use.

EYE CONTACT: Flush with water for at least 15 minutes. SEE PHYSICIAN.

INGESTION: DO NOT INDUCE VOMITING.

If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. CALL A PHYSICIAN.

Section VI — REACTIVITY DATA

STABILITY: ☐ UNSTABLE ☒ STABLE

HAZARDOUS POLYMERIZATION: ☐ MAY OCCUR ☒ WILL NOT OCCUR

HAZARDOUS DECOMPOSITION PRODUCTS: Combustion produces carbon monoxide and carbon dioxide. Unidentified organic compounds may be formed.

MATERIALS AND CONDITIONS TO AVOID: Strong acids, strong alkalis, strong oxidizers.

Section VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.

WASTE DISPOSAL METHOD: Incinerate in approved facility. Do not incinerate closed containers. Dispose in accordance with local, state and federal regulations.

Section VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Avoid breathing concentrated vapors or overspray particles if sprayed. In confined or poorly ventilated areas, use NIOSH approved mask with chemical canister or supplied air.

VENTILATION: Provide general mechanical ventilation or local exhaust ventilation sufficient to keep concentration of solvent vapors below 50 PPM

PROTECTIVE GLOVES: Use chemical resistant, impervious gloves for prolonged or repeated contact.

EYE PROTECTION: Safety goggles or face shield where splashes can occur.

OTHER PROTECTIVE EQUIPMENT:

Section IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: ☒ FLAMMABLE ☐ COMBUSTIBLE

Keep in closed containers. Avoid sparks or flame when handling. Can be stored under ambient conditions. Keep closures tight and containers upright to prevent leakage.

OTHER PRECAUTIONS: Avoid prolonged and repeated contact with the skin. Use good personal hygiene practices. Wash hands thoroughly before eating/drinking/smoking/using toilet facilities.

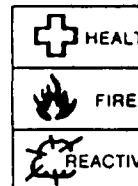
Inhalation of formaldehyde has been shown to cause cancer in laboratory animals.



the daries - young company
2700 Wagner Place, Maryland Heights, Missouri 63043

N.F.P.A.

HAZARD RATING.
4 = EXTREME
3 = HIGH
2 = MODERATE
1 = SLIGHT
0 = INSIGNIFICANT



Material Safety Data

Emergency Telephone: 314/291-1900 (8 a.m. - 5 p.m.) 314/768-1959 (5 p.m. - 8 a.m. - Medical Emergency)

SECTION I - IDENTIFICATION

PRODUCT NAME Buckeye Blue		DATE PREPARED May 9, 1988
CHEMICAL FAMILY All Purpose Cleaner		CODE 5001
DEPARTMENT OF TRANSPORTATION	HAZARD CLASSIFICATION None	
	SHIPPING NAME Cleaning Compound, Liquid	

SECTION II - HAZARDOUS INGREDIENTS

% BY WEIGHT	MATERIAL	C.A.S. NUMBER
	None	

SECTION III - PHYSICAL DATA

BOILING POINT F	210°	SPECIFIC GRAVITY (H ₂ O = 1)	1.04
VAPOR PRESSURE	Not Determined	% VOLATILE BY WEIGHT	88
VAPOR DENSITY	Not Determined	EVAPORATION RATE (WATER = 1)	1.0
SOLUBILITY IN WATER	Infinite	pH Concentrate 1-128	11.2 10.4
APPEARANCE AND ODOR	Clear Blue Solution - Citrus Odor		

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT (METHOD USED)	None Tag C.C.	FLAMMABLE LIMITS	UPPER N/A	LOWER N/A
EXTINGUISHING MEDIA <input type="checkbox"/> CO ₂ <input type="checkbox"/> FOAM <input type="checkbox"/> DRY CHEMICAL <input type="checkbox"/> WATER <input type="checkbox"/> OTHER N/A				
SPECIAL FIREFIGHTING PROCEDURES None				
UNUSUAL FIRE AND EXPLOSION HAZARDS None				

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SECTION V - HEALTH HAZARD DATA**EFFECTS OF OVEREXPOSURE**THRESHOLD
LIMIT VALUE

None

CONTACT Causes temporary irritation, redness

SKIN
CONTACT Not a skin irritant

INHALATION None

INGESTION Not Toxic (LD_{50} in excess of 5010 mg/kg)**EMERGENCY AND
FIRST AID PROCEDURES**Concentrate may cause eye irritation.
Flush with water, If irritation persists see physician.**SECTION VI - REACTIVITY DATA**

STABILITY	STABLE	X	CONDITIONS TO AVOID	N/A
	UNSTABLE			
INCOMPATIBILITY			Avoid mixing with bleach	
HAZARDOUS COMPOSITION PRODUCTS			None determined	
HAZARDOUS POLYMERIZATION	WILL OCCUR		CONDITIONS TO AVOID	N/S
	WILL NOT OCCUR	X		

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Pick-up with mops or wet-dry vacuum equipment Rinse with water
WASTE DISPOSAL METHOD	Mix with water, introduce to sewer

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION	None required		
VENTILATION	Normal room ventilation		
PROTECTIVE GLOVES	Not required	EYE PROTECTION	Safety glasses while pouring concentrate
OTHER PROTECTIVE EQUIPMENT	None		

SECTION IX - SPECIAL PRECAUTIONS**PRECAUTIONS IN HANDLING
AND STORAGE AND OTHER CAUTIONS**

Normal Storage Conditions

PREPARED BY: C. E. Zackrison, Director of Research

TRW-00327

M A T E R I A L S A F E T Y D A T A S H E E T
EM SCIENCE
A DIVISION OF EM INDUSTRIES
111 WOODCREST
CHERRY HILL, N.J. 08034-0325

PREPARATION DATE: OCT 27, '87

INFORMATION PHONE NUMBER.:
(609) 354-9200
CHEMTREC EMERGENCY NUMBER:
1-800-424-9300

| NEPA HAZARD RATINGS
|

| HEALTH: 0 FLAMMABILITY: 0
| REACTIVITY : 0 SPECIAL HAZARDS.: N/A

SECTION I - GENERAL INFORMATION

CATALOG NUMBER(S): BX1623 BX1634
CHEMICAL NAME.....: BUFFER SOLUTION PH
TRADE NAME.....: N/A
C.A.S. NUMBER.....: N/A
CHEMICAL FAMILY...: INORGANIC SOLUTION
FORMULA.....: WATER SOLUTION (99+% H2O)
MOLECULAR WEIGHT.: N/A
DOT SHIPPING NAME: N/A
DOT NUMBER.....: N/A

SECTION II - HAZARDOUS INGREDIENTS

COMPONENT	CAS #	APPROX %	TLV (TWA)	TLV (TWA)
POTASSIUM HYDROGEN PHTHALATE	877-24-7	1	N/E	N/E
WATER	7732-18-5	99	N/E	N/E
OTHER COMPONENTS (INCLUDING DYE FOR COLORED BUFFER) IN NEGLIGIBLE AMOUNTS				

SECTION III- PHYSICAL DATA

BOILING POINT (C 760 MM HG)..<: 100C
MELTING POINT (C).....: N/A
SPECIFIC GRAVITY(H2O = 1).....: 1.000
VAPOR PRESSURE..(MM HG).....: N/A N/A
PERCENT VOLATILE BY VOL (%)...: 99
VAPOR DENSITY (AIR=1).....: N/A
EVAPORATION RATE (BUAC=1).....: N/A
SOLUBILITY IN WATER (%).....: MISCIBLE
APPEARANCE AND ODOR.....: COLORLESS OR RED
ODORLESS LIQUID

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SECTION IV - FIRE & EXPLOSION HAZARD DATA

FLASH POINT (F).....: NONCOMBUSTIBLE
FLAMMABLE LIMITS LEL %.: N/A
FLAMMABLE LIMITS UEL %.: N/A
EXTINGUISHING MEDIA.....:
ANY SUITABLE FOR OTHER MATERIALS INVOLVED
FIRE FIGHTING PROC.....:
NONE
FIRE & EXPL. HAZARDS....:
-NONE

SECTION V - HEALTH HAZARD DATA (ACUTE AND CHRONIC)

ACGIH TLV/OSHA PEL (TWA).....:
& PEL: NONE ESTABLISHED
TOXICITY DATA.....:
-N/A
SYMPTOMS OF EXPOSURE:
-MAY CAUSE EYE IRRITATION ON CONTACT
MEDICAL COND. AGGRAVATED BY EXP: DATA NOT AVAILABLE.
ROUTES OF ENTRY.....: INHALATION, INGESTION OR SKIN CONTACT.
CARCINOGENICITY.....: SEE COMMENTS, SECTION X; IF NO INFORM-
ATION APPEARS, THE MATERIAL IS NOT LISTED AS A CANCER CAUSING AGENT.
EMERGENCY FIRST AID.....:
GET MEDICAL ASSISTANCE IF ANY ADVERSE EFFECTS DEVELOP
SKIN: WASH WITH SOAP AND WATER THOROUGHLY
EYES: FLUSH THOROUGHLY WITH WATER
INGESTION: IF CONSCIOUS, INDUCE VOMITING

SECTION VI - REACTIVITY DATA

STABILITY.....: YES
CONDITIONS TO AVOID:
-NONE
MATERIALS TO AVOID.....: () WATER () ACIDS
() BASES () CORROSIVES () OXIDIZERS
() OTHER (SPECIFY)- NONE
HAZARDOUS POLYMERIZATION.: DATA NOT AVAILABLE.
HAZARDOUS DECOMPOSITION.: -COX, K2O (SMALL QUANTITIES OF EACH)

SECTION VII - ENVIRONMENTAL PROTECTION PROCEDURES

SPILL RESPONSE:
-TAKE UP ON ABSORBENT AND CONTAINERIZE
FLUSH AREA WITH WATER
WASTE DISPOSAL: TO BE PERFORMED IN COMPLIANCE WITH ALL CURRENT LOCAL,
STATE AND FEDERAL REGULATIONS.

SECTION VIII - SPECIAL PROTECTION INFORMATION

VENTILATION, RESPIRATORY PROTECTION, PROTECTIVE CLOTHING, EYE PROTECTION:
-MATERIAL SHOULD BE HANDLED OR TRANSFERRED IN AN APPROVED FUME
HOOD OR WITH ADEQUATE VENTILATION

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PROTECTIVE GLOVES (NATURAL RUBBER, NEOPRENE, PVC OR EQUIVALENT)
SHOULD BE WORN TO PREVENT SKIN CONTACT
SAFETY GLASSES WITH SIDE SHIELDS SHOULD BE WORN AT ALL TIMES

SECTION IX - SPECIAL PROTECTION INFORMATION

HANDLING & STORAGE

-KEEP CONTAINER CLOSED

STORE AT CONTROLLED ROOM TEMPERATURE

DO NOT BREATHE SOLUTION MIST

DO NOT GET IN EYES

AVOID PROLONGED OR REPEATED SKIN CONTACT

DO NOT TAKE INTERNALLY

WORK/HYGIENIC PRACTICES: WASH THOROUGHLY AFTER HANDLING. DO NOT TAKE
INTERNALLY. EYE WASH AND SAFETY EQUIPMENT SHOULD BE READILY AVAILABLE.

SECTION X - OTHER INFORMATION

COMMENTS.....:

-

REV. 2/87

N/A

REVISION HISTORY.....: 12/01/83, N/A

OCT 27, '87

N/A = NOT AVAILABLE:

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PAGE # : 03

TRW-00330

0908-1695

and SCIENCE

A DIVISION OF EM INDUSTRIES

1.1.1. PROBLEMS

111 WOODCREST

CHERRY HILL, N.J. 08034-0395

PREPARATION DATE: OCT 27, '87

INFORMATION PHONE NUMBER.:

(607) 354-7200

CHAMBERED EMERGENCY NUMBER:

1-370-424-9300

NEPA HAZARD RATINGS

NEPA HAZARD RATINGS

HEALTH . . . : 0

FLAMMABILITY ...: 0

REACTIVITY : 0

SPECIAL HAZARDS.: N/A

SECTION I - GENERAL INFORMATION

CATALOG NUMBER(S): BX1632 BX1635

CHEMICAL NAME.....: BUFFER SOLUTION, PH 7

TRADE NAME.....: N/A

C.A.S. NUMBER.....: 7732-18-5 (420)

CHEMICAL FAMILY...: INORGANIC SOLUTION:

FORMULA.....: WATER SOLUTION (92+% H₂O)

MOLECULAR WEIGHT.: N/A

DOT SHIPPING NAME: N/A

DOT NUMBER.....: N/A

SECTION II - HAZARDOUS INGREDIENTS

-NONE OTHER THAN SPECIFIED PRODUCT

SECTION III- PHYSICAL DATA

BOILING POINT (C 760 MM HG): 100C

MELTING POINT (C).....: N/A

SPECIFIC GRAVITY(H₂O = 1).....: 1.000

VAPOR PRESSURE..(MM HG).....: N/A 20C

PERCENT VOLATILE BY VOL (%): 99+

VAPOR DENSITY (AIR=1).....: N/A

EVAPORATION RATE (BUAC=1).....: N/A

SOLUBILITY IN WATER (%):.....: MISCIBLE

APPEARANCE AND ODOR.....: CLEAR, ODORLESS,

COLORLESS OR YELLOW LIQUID

SECTION IV - FIRE & EXPLOSION HAZARD DATA

FLASH POINT (F).....: NONCOMBUSTIBLE

FLAMMABLE LIMITS LEL %: N/A

FLAMMABLE LIMITS UEL %: N/A

EXTINGUISHING MEDIA.....:

ANY SUITABLE FOR OTHER MATERIALS INVOLVED

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FIRE FIGHTING PROC.....:

NONE

FIRE & EXPL. HAZARDS....:

-NONE

SECTION V - HEALTH HAZARD DATA (ACUTE AND CHRONIC)

ACGIH TLV/OSHA PEL (TWA).....:

& PEL: NONE ESTABLISHED

TOXICITY DATA.....:

-N/A

SYMPTOMS OF EXPOSURE.....:

-MAY IRRITATE EYES ON CONTACT

MEDICAL COND. AGGRAVATED BY EXP: DATA NOT AVAILABLE.

ROUTES OF ENTRY.....: INHALATION, INGESTION OR SKIN CONTACT.

CARCINOGENICITY.....: SEE COMMENTS, SECTION X; IF NO INFORMATION APPEARS, THE MATERIAL IS NOT LISTED AS A CANCER CAUSING AGENT.

EMERGENCY FIRST AID.....:

GET MEDICAL ASSISTANCE IF ANY ADVERSE EFFECTS DEVELOP

SKIN: WASH WITH SOAP AND WATER THOROUGHLY

EYES: FLUSH THOROUGHLY WITH WATER

INGESTION: IF CONSCIOUS, INDUCE VOMITING

SECTION VI - REACTIVITY DATA

STABILITY.....: YES

CONDITIONS TO AVOID.....:

-NONE

MATERIALS TO AVOID.....: () WATER () ACIDS

() BASES () CORROSIVES () OXIDIZERS

() OTHER (SPECIFY)- NONE

HAZARDOUS POLYMERIZATION.: DATA NOT AVAILABLE.

HAZARDOUS DECOMPOSITION.: -NONE

SECTION VII - ENVIRONMENTAL PROTECTION PROCEDURES

SPILL RESPONSE:

-TAKE UP ON ABSORBENT AND CONTAINERIZE

FLUSH AREA WITH WATER

WASTE DISPOSAL: TO BE PERFORMED IN COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION VIII - SPECIAL PROTECTION INFORMATION

VENTILATION, RESPIRATORY PROTECTION, PROTECTIVE CLOTHING, EYE PROTECTION:

-MATERIAL SHOULD BE HANDLED OR TRANSFERRED IN AN APPROVED FUME

HOOD OR WITH ADEQUATE VENTILATION

PROTECTIVE GLOVES (NATURAL RUBBER, NEOPRENE, PVC OR EQUIVALENT)

SHOULD BE WORN TO PREVENT SKIN CONTACT

SAFETY GLASSES WITH SIDE SHIELDS SHOULD BE WORN AT ALL TIMES

SECTION IX - SPECIAL PROTECTION INFORMATION

HANDLING & STORAGE.....:

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-KEEP CONTAINER CLOSED
STORE AT CONTROLLED ROOM TEMPERATURE
DO NOT BREATHE SOLUTION MIST
DO NOT GET IN EYES
DO NOT TAKE INTERNALLY
AVOID PROLONGED OR REPEATED SKIN CONTACT
WORK/HYGIENIC PRACTICES: WASH THOROUGHLY AFTER HANDLING. DO NOT TAKE
INTERNALLY. EYE WASH AND SAFETY EQUIPMENT SHOULD BE READILY AVAILABLE.

SECTION X - OTHER INFORMATION

COMMENTS.....:

-PRODUCT CONTAINS LESS THAN 0.5% OF POTASSIUM PHOSPHATE, MONOBASIC
AND SODIUM PHOSPHATE, DIBASIC AS ACTIVE INGREDIENTS

BX1632 ALSO CONTAINS LESS THAN 0.01% OF INERT INGREDIENTS

REV. 2/37

REVISION HISTORY.....: 12/01/83, N/A

OCT 27, '87

N/A = NOT AVAILABLE:

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M A T E R I A L S A F E T Y D A T A S H E E T
EM SCIENCE
A DIVISION OF EM INDUSTRIES
111 WOODCREST
CHERRY HILL, N.J. 08034-0395

PREPARATION DATE OCT 27, '87

INFORMATION PHONE NUMBER.:
(609) 354-9200
CHEMTREC EMERGENCY NUMBER:
1-800-424-9300

HFA HAZARD RATINGS

HEALTH 0 FLAMMABILITY 0
REACTIVITY : 0 SPECIAL HAZARDS.: N/A

SECTION I - GENERAL INFORMATION

CATALOG NUMBER(S): BX1633 BX1635
CHEMICAL NAME..... BUFFER SOLUTION, PH 10
TRADE NAME.....: N/A
C.A.S. NUMBER.....: N/A
CHEMICAL FAMILY...: INORGANIC SOLUTION
FORMULA.....: WATER SOLUTION OF BUFFER SALTS (99+% H2O)
MOLECULAR WEIGHT.: N/A
DOT SHIPPING NAME: N/A
DOT NUMBER.....: N/A

SECTION II - HAZARDOUS INGREDIENTS

-NONE OTHER THAN SPECIFIED PRODUCT

SECTION III- PHYSICAL DATA

BOILING POINT (C 760 MM HG): 100C
MELTING POINT (C).....: N/A
SPECIFIC GRAVITY(H2O = 1)....: 1.000
VAPOR PRESSURE..(MM HG).....: N/A N/A
PERCENT VOLATILE BY VOL (%): 99+
VAPOR DENSITY (AIR=1).....: N/A
EVAPORATION RATE (BUAC=1)....: N/A
SOLUBILITY IN WATER (%).....: N/A
APPEARANCE AND ODOR.....: CLEAR OR GREEN ODORLESS
LIQUID

SECTION IV - FIRE & EXPLOSION HAZARD DATA

FLASH POINT (F).....: NONCOMBUSTIBLE
FLAMMABLE LIMITS LEL %.: N/A
FLAMMABLE LIMITS UEL %.: N/A
EXTINGUISHING MEDIA.....:

ANY SUITABLE FOR OTHER MATERIALS INVOLVED

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FIRE FIGHTING PROC.....:

NONE

FIRE & EXPL. HAZARDS....:

-NONE

SECTION V - HEALTH HAZARD DATA (ACUTE AND CHRONIC)

ACGIH TLV/OSHA PEL (TWA).....:

& PEL: NONE ESTABLISHED

TOXICITY DATA.....:

-N/A

SYMPTOMS OF EXPOSURE

-MAY IRRITATE EYES AND SKIN ON CONTACT

MAY IRRITATE G.I. TRACT ON INGESTION

MEDICAL COND. AGGRAVATED BY EXP: DATA NOT AVAILABLE.

ROUTES OF ENTRY.....: INHALATION, INGESTION OR SKIN CONTACT.

CARCINOGENICITY.....: SEE COMMENTS, SECTION X; IF NO INFORMATION APPEARS, THE MATERIAL IS NOT LISTED AS A CANCER CAUSING AGENT.

EMERGENCY FIRST AID.....:

GET MEDICAL ASSISTANCE IF ANY ADVERSE EFFECTS DEVELOP

SKIN: WASH WITH SOAP AND WATER THOROUGHLY

EYES: FLUSH THOROUGHLY WITH WATER

INGESTION: IF CONSCIOUS, INDUCE VOMITING

SECTION VI - REACTIVITY DATA

STABILITY.....: YES

CONDITIONS TO AVOID

-NONE

MATERIALS TO AVOID.....: () WATER () ACIDS

() BASES () CORROSIVES () OXIDIZERS

() OTHER (SPECIFY)- NONE

HAZARDOUS POLYMERIZATION.: DATA NOT AVAILABLE.

HAZARDOUS DECOMPOSITION.: -NONE

SECTION VII - ENVIRONMENTAL PROTECTION PROCEDURES

SPILL RESPONSE:

-TAKE UP WITH ABSORBENT AND CONTAINERIZE

FLUSH AREA WITH WATER

WASTE DISPOSAL: TO BE PERFORMED IN COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION VIII - SPECIAL PROTECTION INFORMATION

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HOOD OR WITH ADEQUATE VENTILATION

PROTECTIVE GLOVES (NATURAL RUBBER, NEOPRENE, PVC OR EQUIVALENT)

SHOULD BE WORN TO PREVENT SKIN CONTACT

SAFETY GLASSES WITH SIDE SHIELDS SHOULD BE WORN AT ALL TIMES

SECTION IX - SPECIAL PROTECTION INFORMATION

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HANDLING & STORAGE

- KEEP CONTAINER CLOSED
- STORE AT CONTROLLED ROOM TEMPERATURE
- DO NOT BREATHE SOLUTION MIST
- DO NOT GET IN EYES
- AVOID PROLONGED OR REPEATED SKIN CONTACT
- DO NOT TAKE INTERNALLY
- WORK/HYGIENIC PRACTICES: WASH THOROUGHLY AFTER HANDLING. DO NOT TAKE INTERNALLY. EYE WASH AND SAFETY EQUIPMENT SHOULD BE READILY AVAILABLE.

SECTION X - OTHER INFORMATION

COMMENTS.....:

- PRODUCT CONTAINS LESS THAN 1% OF NON-HAZARDOUS BUFFER SALT
- 3X1633 ALSO CONTAINS LESS THAN 0.01% OF INERT INDICATOR

REV. 2/87

N/A

REVISION HISTORY.....: 12/01/83, N/A
OCT 27, '87

N/A = NOT AVAILABLE:

MSDS-3X1633 PAGE # : 03

LAB 73/
J.T. BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

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~~24 HOUR EMERGENCY TELEPHONE (800) 424-3802~~

CHEMTREC (800) 424-3800 -- NATIONAL RESPONSE CENTER # (800) 424-3802

06100 -04

2-BUTOXYETHANOL

PAGE: 1

EFFECTIVE: 05/01/89

ISSUED: 05/16/89

J.T. BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

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SECTION I - PRODUCT IDENTIFICATION

=====

PRODUCT NAME: ~~2-BUTOXYETHANOL~~
COMMON SYNONYMS: BUTYL CELLOSOLVE; ETHYLENE GLYCOL MONOBUTYL ETHER
CHEMICAL FAMILY: ETHER ALCOHOLS
FORMULA: $\text{CH}_3(\text{CH}_2)_3\text{OCH}_2\text{CH}_2\text{OH}$
FORMULA WT.: 118.18
CAS NO.: 111-76-2
NIOSH/ RTECS NO.: KJ8575000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: D643

=====

PRECAUTIONARY LABELING

=====

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	2	MODERATE
REACTIVITY	-	1	SLIGHT
CONTACT	-	3	SEVERE (LIFE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

U.S. PRECAUTIONARY LABELING

DANGER

COMBUSTIBLE. CAUSES IRRITATION. HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN. EXCEPTIONAL CONTACT HAZARD: READ MATERIAL SAFETY DATA SHEET. KEEP AWAY FROM HEAT, SPARKS, FLAME. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE ALCOHOL FOAM, DRY CHEMICAL, CARBON DIOXIDE - WATER MAY BE INEFFECTIVE. FLUSH SPILL AREA WITH WATER SPRAY.

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TRW-00337

0908-1702

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6100 -04
EFFECTIVE: 05/01/89

2-BUTOXYETHANOL

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PRECAUTIONARY LABELING (CONTINUED)

INTERNATIONAL LABELING

HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED. IRRITATING TO
RESPIRATORY SYSTEM.
AVOID CONTACT WITH SKIN AND EYES.

SAF-T-DATA# STORAGE COLOR CODE: RED (FLAMMABLE)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
2-BUTOXYETHANOL	111-76-2	90-100	50 PPM	25 PPM

SECTION III - PHYSICAL DATA

BOILING POINT: 171 C (339 F)
(AT 760 MM HG) VAPOR PRESSURE (MMHG): 0.6
(20 C)

MELTING POINT: -75 C (-103 F)
(AT 760 MM HG) VAPOR DENSITY (AIR=1): 4.1

SPECIFIC GRAVITY: 0.90
(H2O=1) EVAPORATION RATE: 0.05
(BUTYL ACETATE = 1)

SOLUBILITY(H2O): COMPLETE (100%) % VOLATILES BY VOLUME: 100
(21 C)

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: COLORLESS LIQUID. FAINT P. NOIS. ODOR.

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2-BUTOXYETHANOL

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SECTION IV - FIRE AND EXPLOSION HAZARD DATA

=====

FLASH POINT (CLOSED CUP): 65 C (150 F)

NEPA 704M RATING: 2-2-0

AUTOIGNITION TEMPERATURE: 244 C (472 F)

FLAMMABLE LIMITS: UPPER - 10.6 % LOWER - 1.1 %

FIRE EXTINGUISHING MEDIA

USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE. (WATER MAY BE INEFFECTIVE.)

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED

CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

=====

SECTION V - HEALTH HAZARD DATA

=====

THRESHOLD LIMIT VALUE (TLV/TWA): 100 MG/M3 (75 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 240 MG/M3 (90 PPM)

TOXICITY OF COMPONENTS

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0908-1704

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36100 -04
EFFECTIVE: 05/01/89

2-BUTOXYETHANOL

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SECTION V - HEALTH HAZARD DATA (CONTINUED)

=====

ORAL RAT LD50 FOR 2-BUTOXYETHANOL	1480 MG/KG
INTRAPERITONEAL RAT LD50 FOR 2-BUTOXYETHANOL	220 MG/KG
SKIN RAT LD50 FOR 2-BUTOXYETHANOL	490 MG/KG
INHALATION-4HR RAT LC50 FOR 2-BUTOXYETHANOL	450 PPM
CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO	

CARCINOGENICITY
NONE IDENTIFIED.

REPRODUCTIVE EFFECTS
NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: IRRITATION OF NOSE AND THROAT, NAUSEA, VOMITING

SKIN CONTACT: IRRITATION

EYE CONTACT: IRRITATION

SKIN ABSORPTION: RAPID ABSORPTION

INGESTION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, GASTROINTESTINAL
IRRITATION

CHRONIC EFFECTS: DAMAGE TO LIVER, KIDNEYS, BLOOD

TARGET ORGANS

LIVER, KIDNEYS, RESPIRATORY SYSTEM, LYMPHATIC SYSTEM, BLOOD, EYES, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
SKIN DISORDERS

PRIMARY ROUTES OF ENTRY

INHALATION, INGESTION, ABSORPTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, IF CONSCIOUS, GIVE LARGE
AMOUNTS OF WATER. INDUCE VOMITING.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE
ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE
OXYGEN.

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0908-1705

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EFFECTIVE: 05/01/89

2-BUTYLXYETHANOL

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SECTION V - HEALTH HAZARD DATA (CONTINUED)

=====

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF
WATER FOR AT LEAST 15 MINUTES.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF
WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO
CERCLA HAZARDOUS SUBSTANCE: NO
TOXIC CHEMICALS: NO
TSCA INVENTORY: YES

=====

SECTION VI - REACTIVITY DATA

=====

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION
INCOMPATIBLES: STRONG OXIDIZING AGENTS, STRONG BASES
DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

=====

SECTION VII - SPILL & DISPOSAL PROCEDURES

=====

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. SHUT
OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF
YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP
WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO
CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS
PRODUCT.

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SECTION VII - SPILL & DISPOSAL PROCEDURES (CONTINUED)

=====

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL
ENVIRONMENTAL REGULATIONS.

=====

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

=====

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV
REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE
CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO
700 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC
VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A
SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

YE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE
SUIT, NEOPRENE GLOVES ARE RECOMMENDED.

=====

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

=====

SAF-T-DATA* STORAGE COLOR CODE: RED (FLAMMABLE)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED,
FLAMMABLE LIQUID STORAGE AREA OR CABINET.

=====

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

=====

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: COMBUSTIBLE LIQUID, N.O.S. (2-BUTOXYETHANOL)
HAZARD CLASS: COMBUSTIBLE LIQUID
UN/NA: NA1993
LABELS: NO LABEL REQUIRED UNDER 110 GALLONS
REGULATORY REFERENCES: 49CFR 172.101; 173.115A

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2-BUTOXY ETHANOL

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SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: ETHYLENE GLYCOL MONOBUTYL ETHER
HAZARD CLASS: 6.1 I.M.O. PAGE: 6136
UN: UN2369 MARINE POLLUTANTS: NO PACKAGING GROUP: III
LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: ETHYLENE GLYCOL MONOBUTYL ETHER
HAZARD CLASS: 6.1
UN: UN2369 PACKAGING GROUP: III
LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS
REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA

U.S. CUSTOMS HARMONIZATION NUMBER: 29094300007

N/A = NOT APPLICABLE OR NOT AVAILABLE
N/E = NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND
CONTINUED ON PAGE: 8

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EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. IF YOU HAVE ANY QUESTIONS, PLEASE CALL CUSTOMER SERVICE (1-800-JT BAKER) FOR ASSISTANCE.

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APPROVED BY QUALITY ASSURANCE DEPARTMENT.

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TRW-00344

0908-1709